WAL-MART® SHOPPING LIST

☑ Refill prescription at Wal-Mart Pharmacy

☐ p30 = TS430S RF UNIT

☐ (X44-1510-00/11)

☐ P29 = BLOCK DIAGRAM

☐ p31 = TS430S IF unit

☐ (X48-1370-00)

☐ p32 = PLL UNIT (X50-1910-0

☐ p33 = TS430S schematic DIA

☐ P34 = (apparent cont)

(FILTER UNIT

☐ X51-1290-00)

☐ P35 TS430 schematic

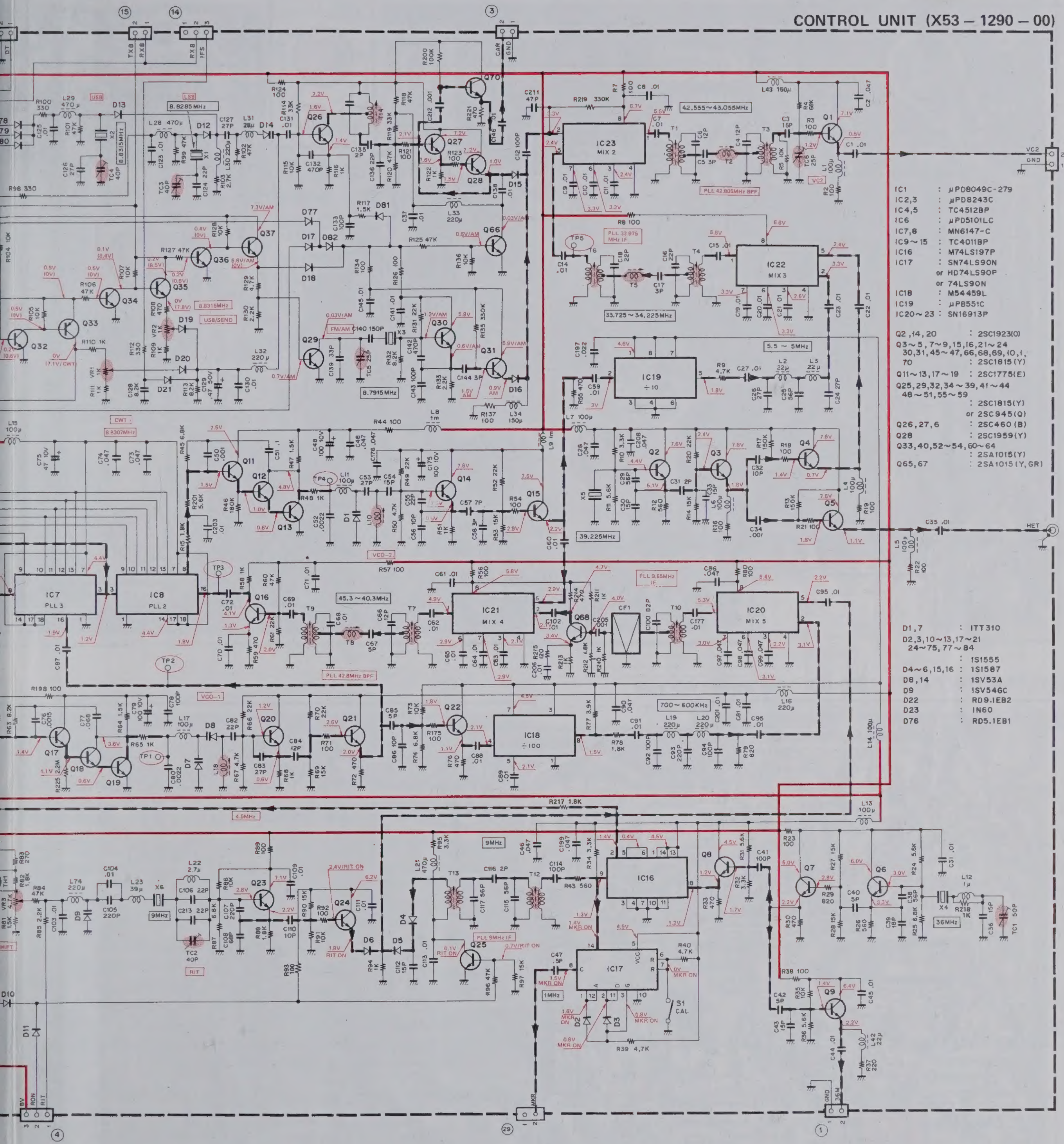
P36 CONT

P37

spare PART Ordering

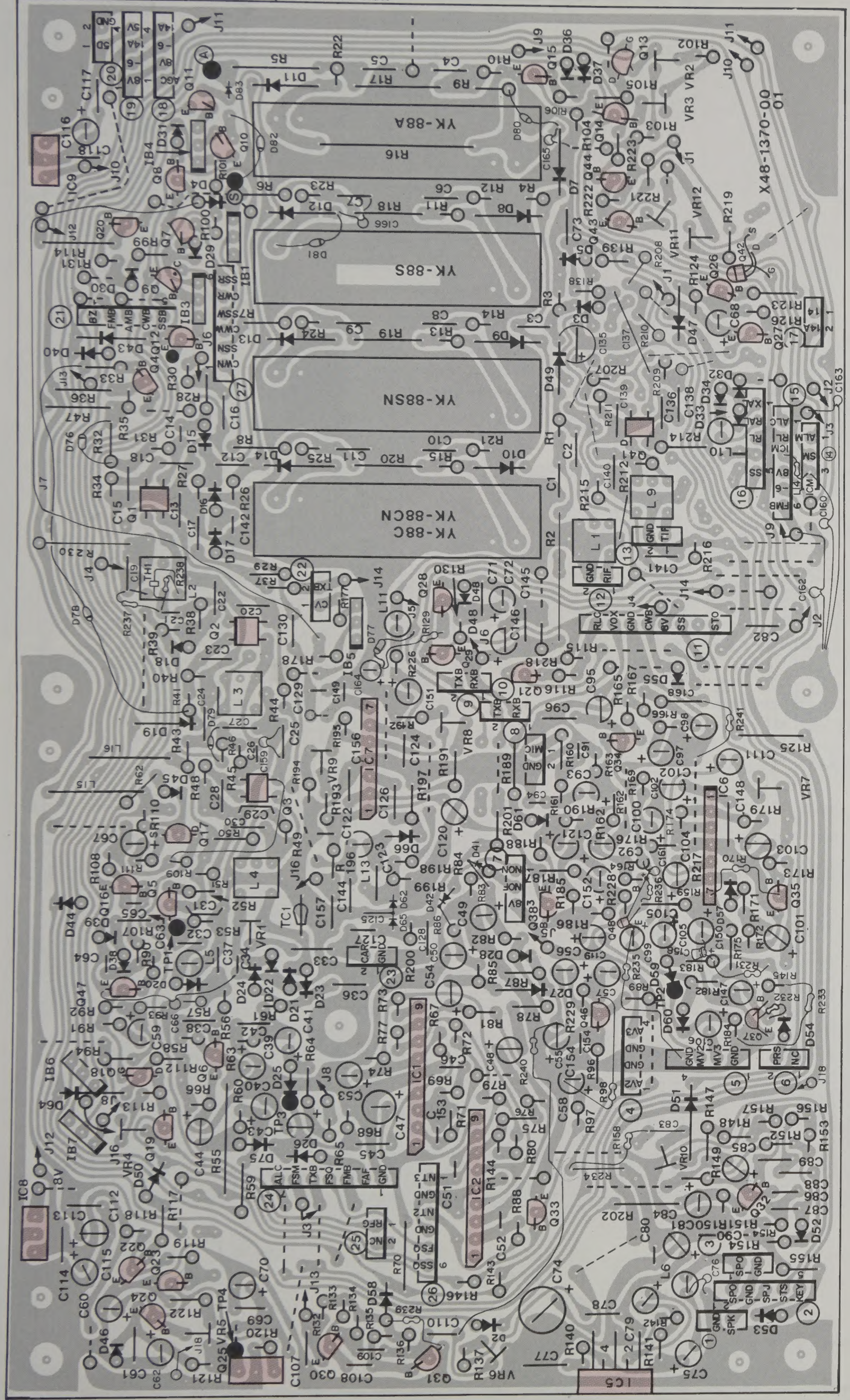
WAL-MART®
PHARMACY

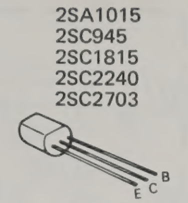
CIRCUIT DIAGRAM **TS-430S**

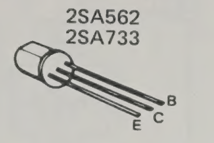


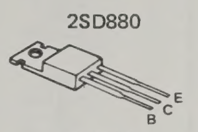
TS-430S PC BOARD VIEW

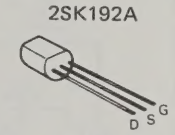
IF UNIT (X48-1370-00) Component side view

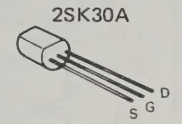


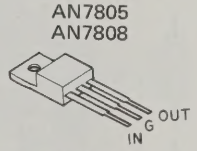


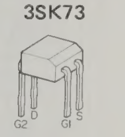


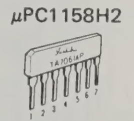


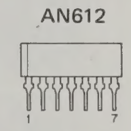


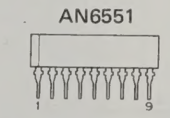




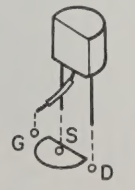








<Attachment method of Q18>



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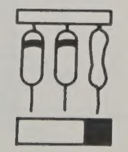
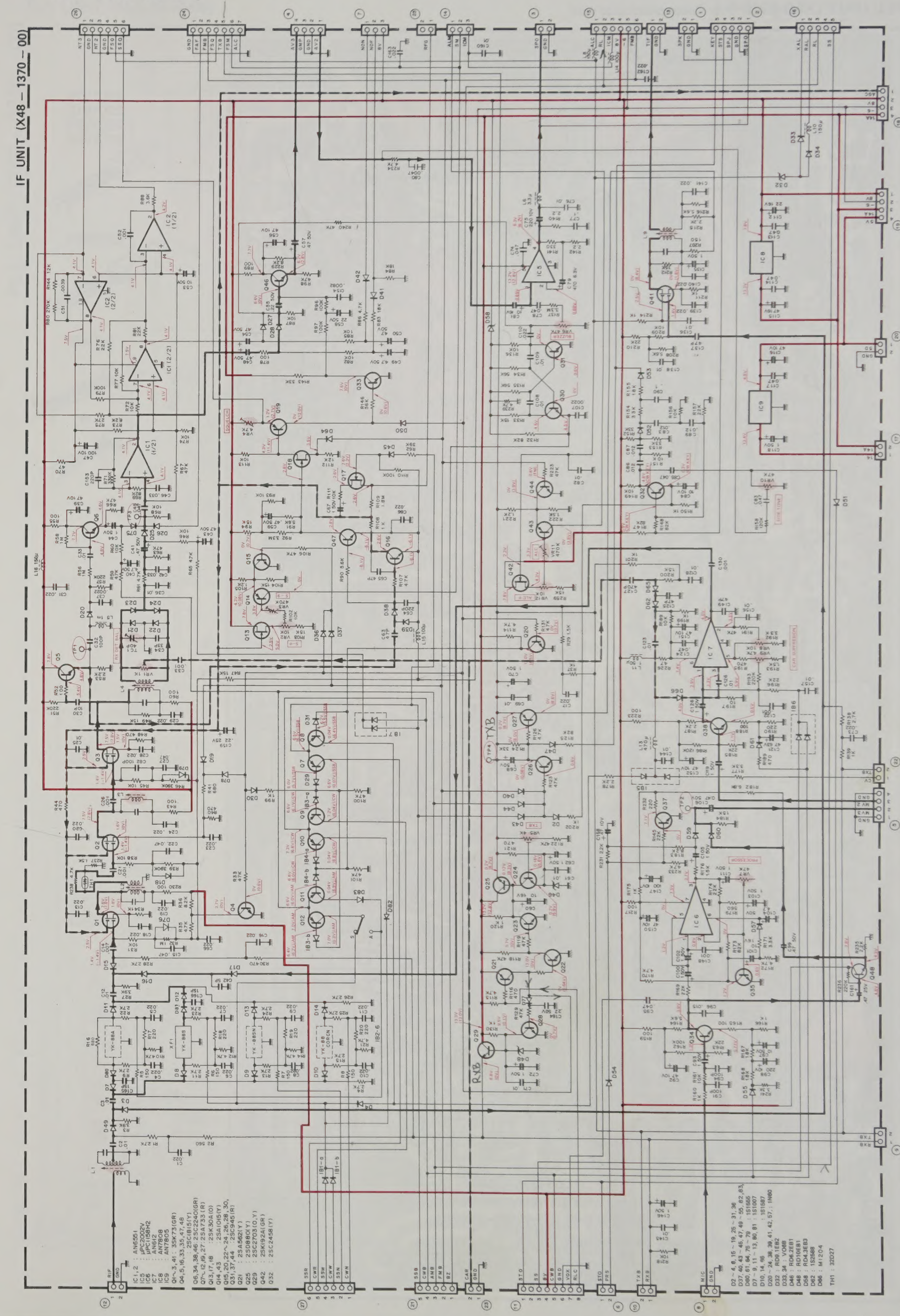


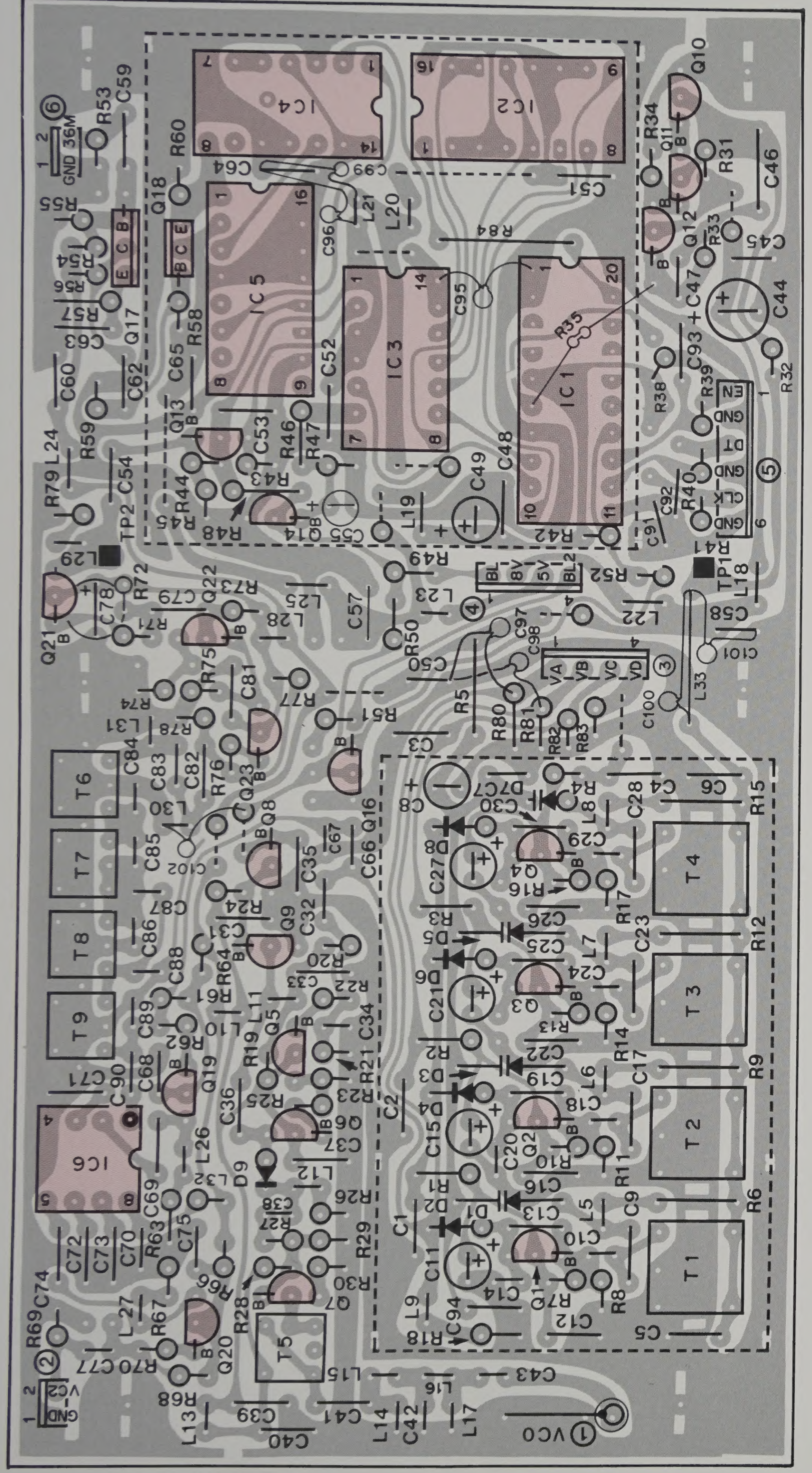
CIRCUIT DIAGRAM TS-430S

IF UNIT (X48-1370-00)



TS-430S PC BOARD VIEW

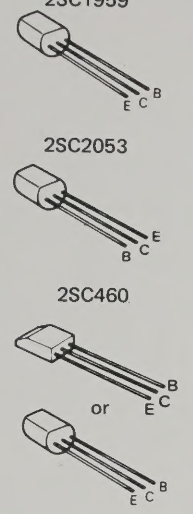
PLL UNIT (X50-1910-00) **Component side view**



2SC1775
2SC1815
2SC1923
2SC1959

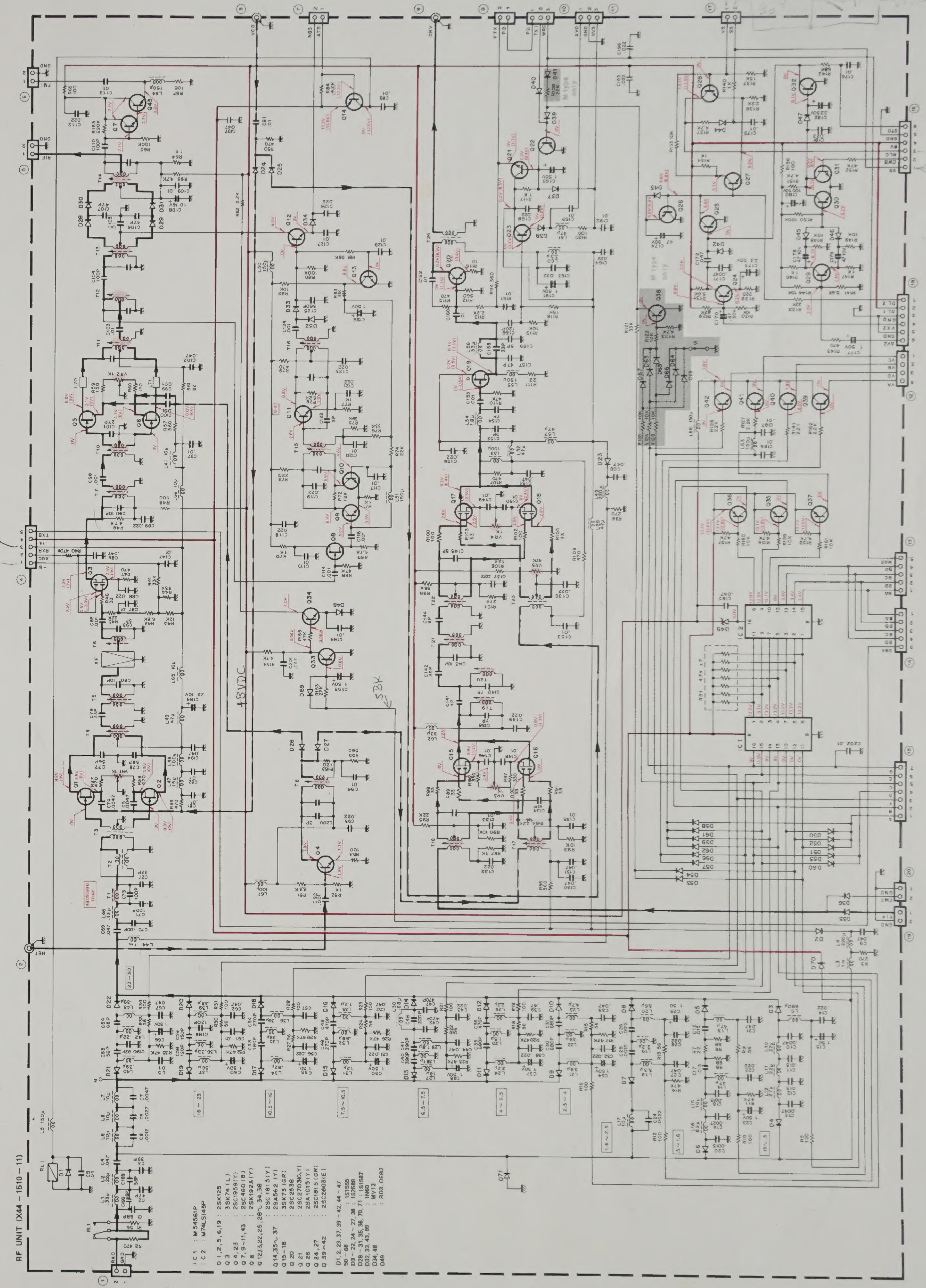
2SC2053

2SC460



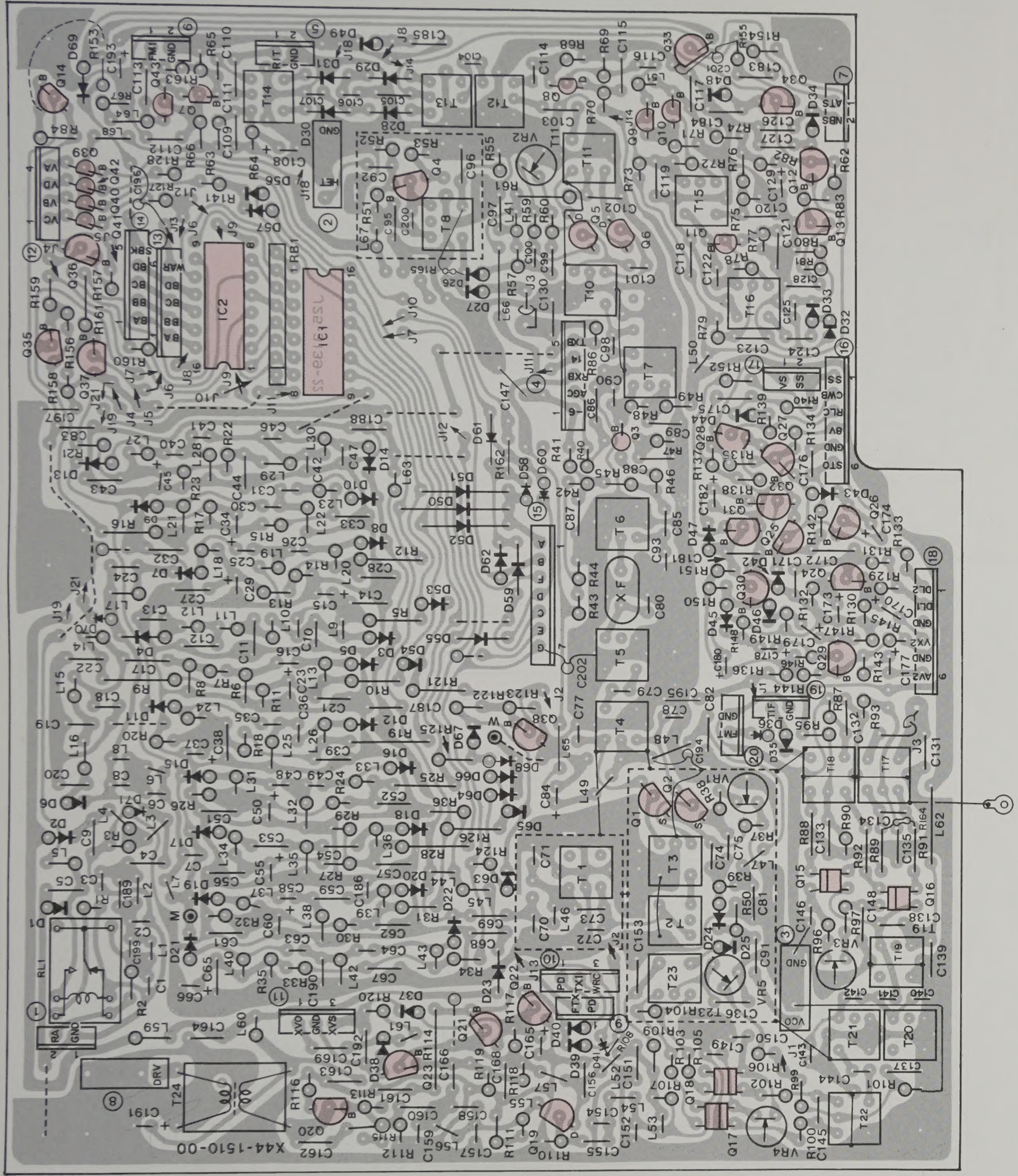
CIRCUIT DIAGRAM TS-430S

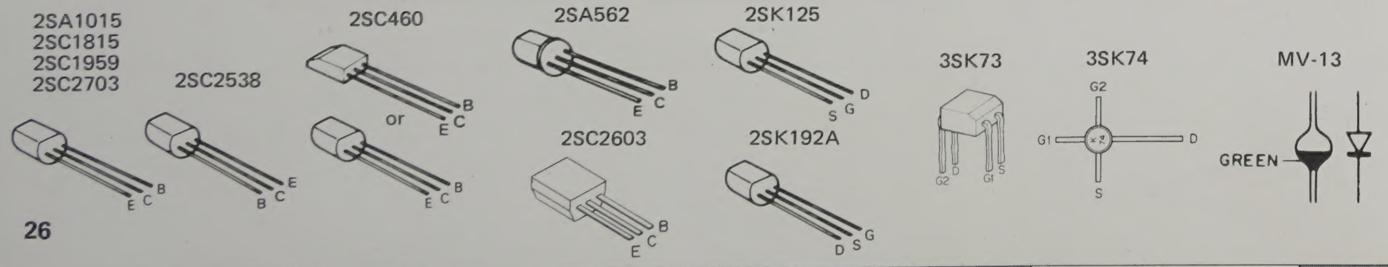
RF UNIT (X44-1510-11)



TS-430S PC BOARD VIEW

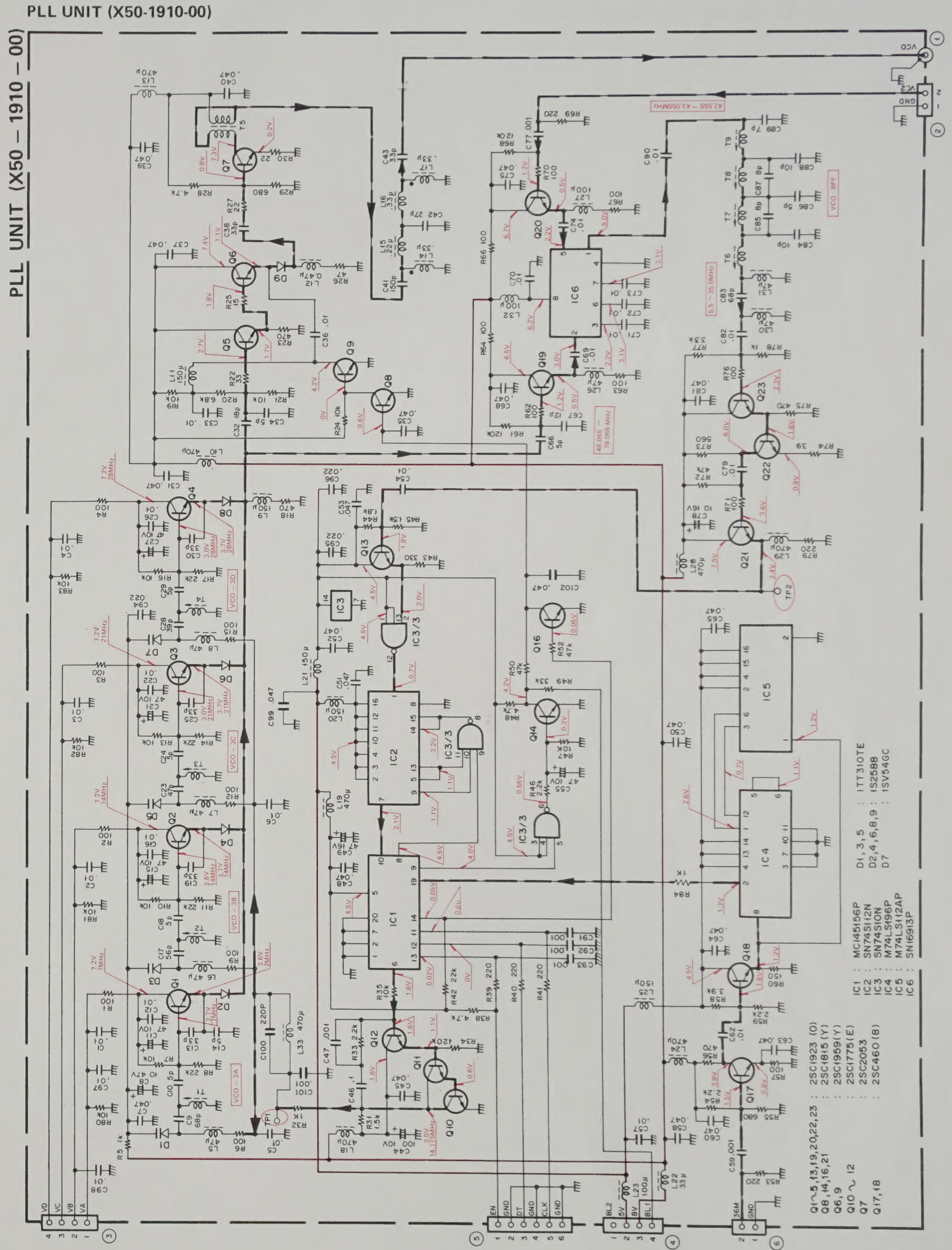
RF UNIT (X44-1510-11) Component side view





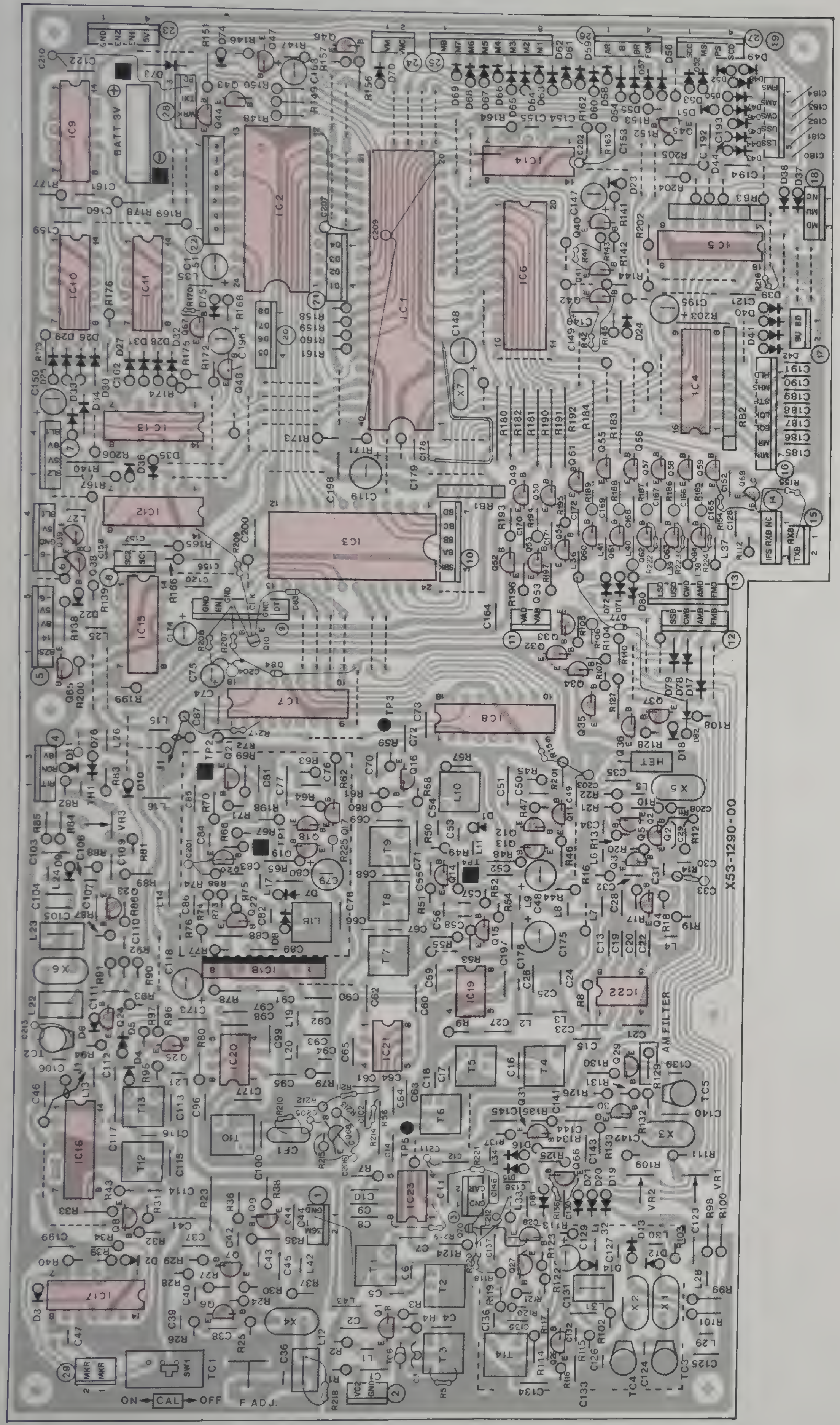
CIRCUIT DIAGRAM TS-430S

PLL UNIT (X50-1910-00)

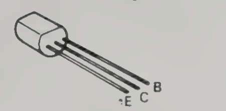


TS-430S PC BOARD VIEW

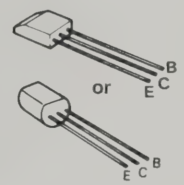
CONTROL UNIT (X53-1290-00) Component side view



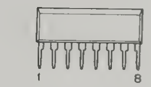
2SA1015
2SC945
2SC1775
2SC1815
2SC1923
2SC1959



2SC460

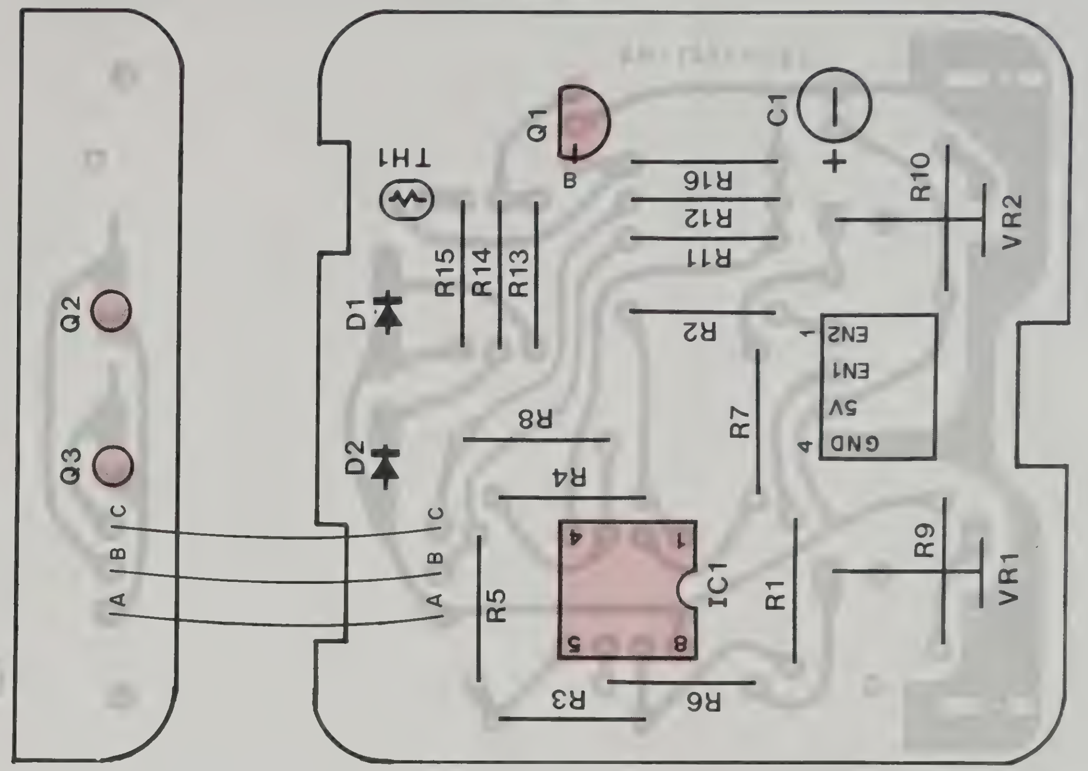


M54459L



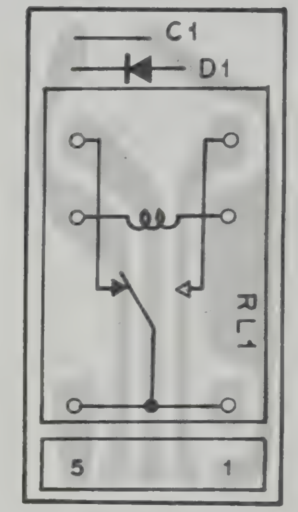
PC BOARD VIEWS TS-430S

ENCODER ASS'Y (J25-3141-04) Component side view



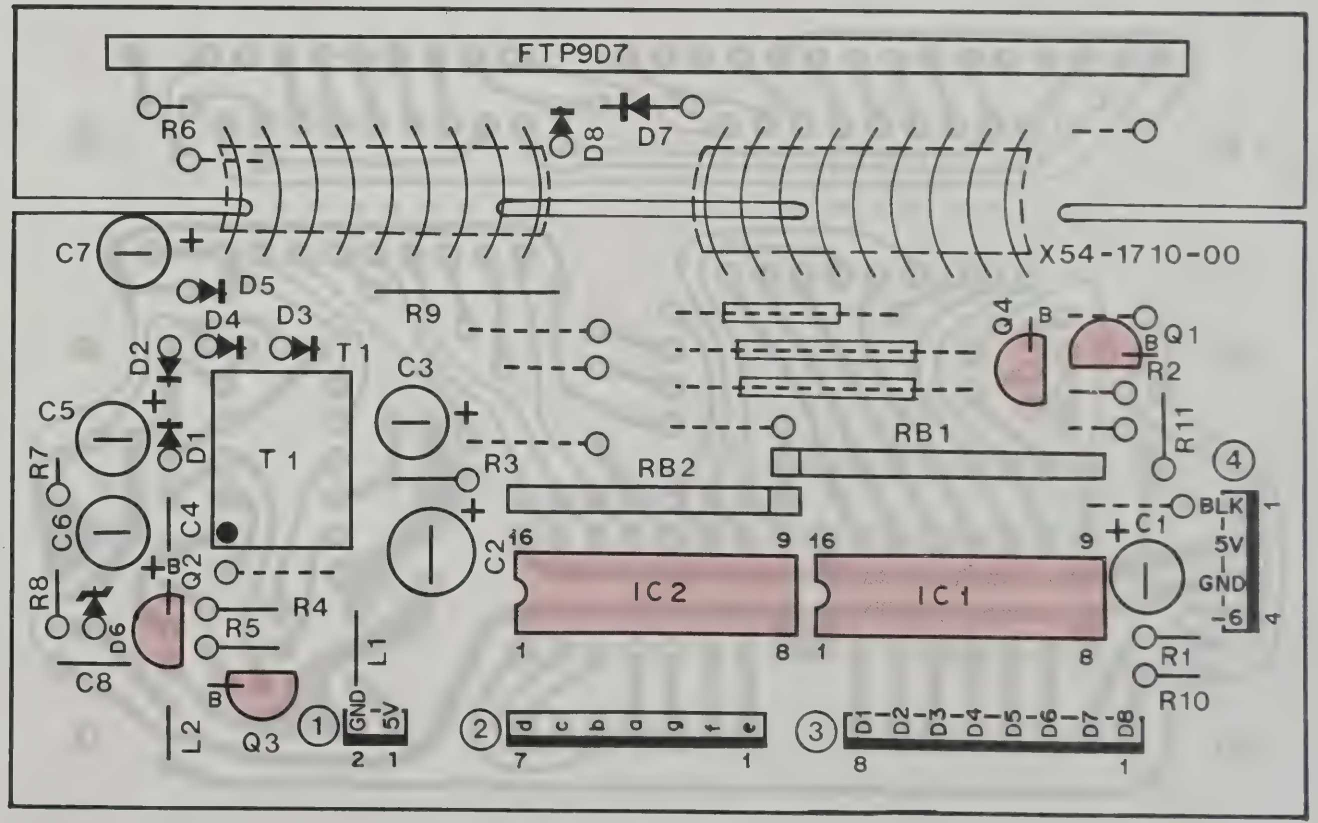
Q1 : 2SA1015(Y) Q2,3 : PN126S
D1,2 : LN66(R)
IC1: LM358P

RELAY BOARD
Component side view



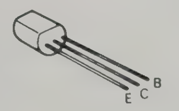
D1 : 1S1555

DISPLAY UNIT (X54-1710-00) Component side view

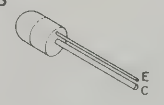


Q1,4 : 2SA1015(Y) Q2,3 : 2SC1959(Y)
D1–4,7,8 : 1S1555 D5 : RD9.1EB2 D6 : RD6.2EB2

2SC945
2SC1015
2SC1815
2SC1959

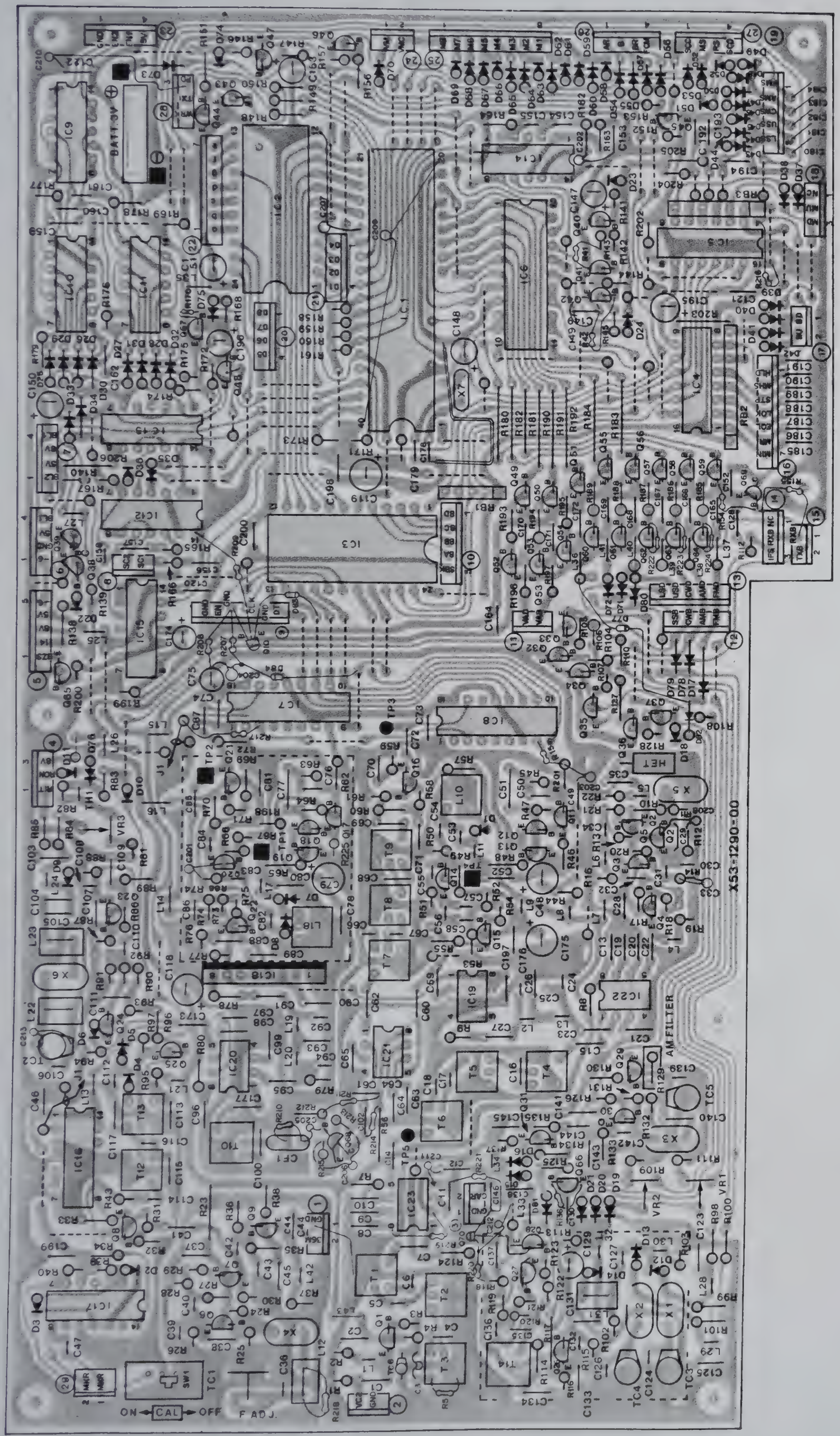


PN126S

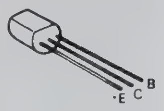


TS-430S PC BOARD VIEW

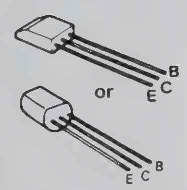
CONTROL UNIT (X53-1290-00) Component side view



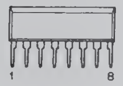
2SA1015
2SC945
2SC1775
2SC1815
2SC1923
2SC1959



2SC460

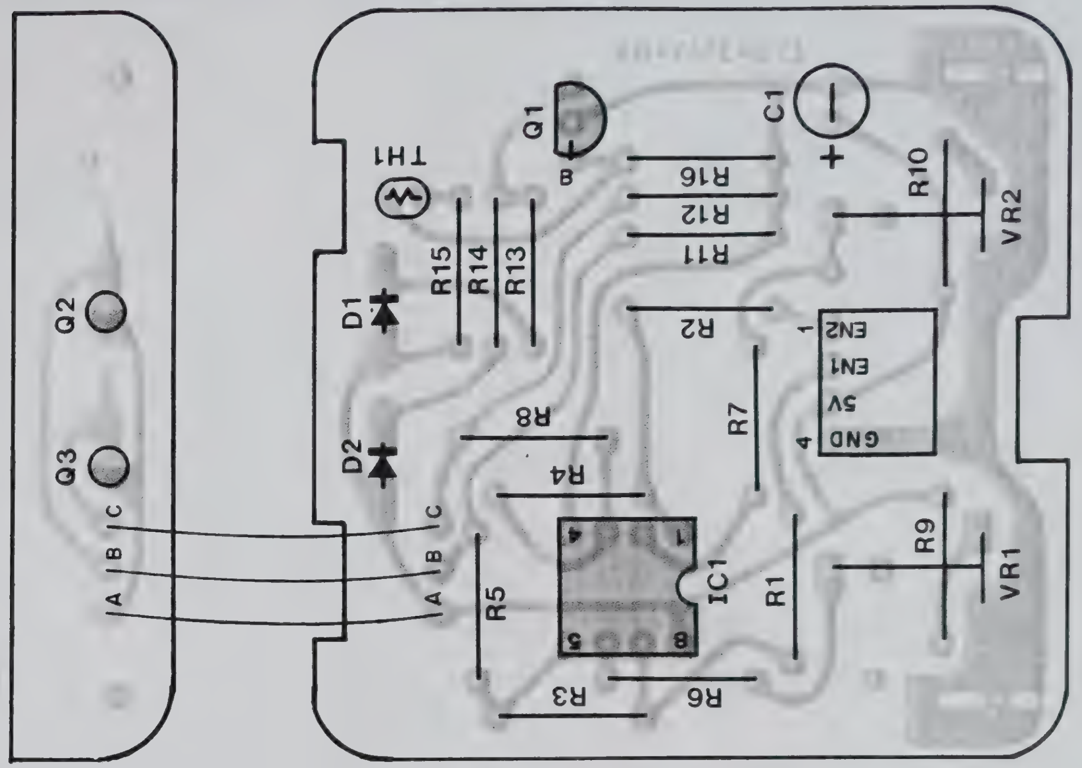


M54459L



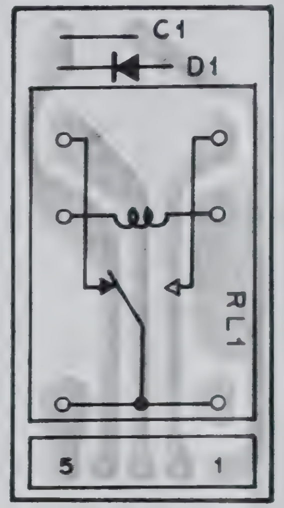
PC BOARD VIEWS TS-430S

ENCODER ASS'Y (J25-3141-04) Component side view



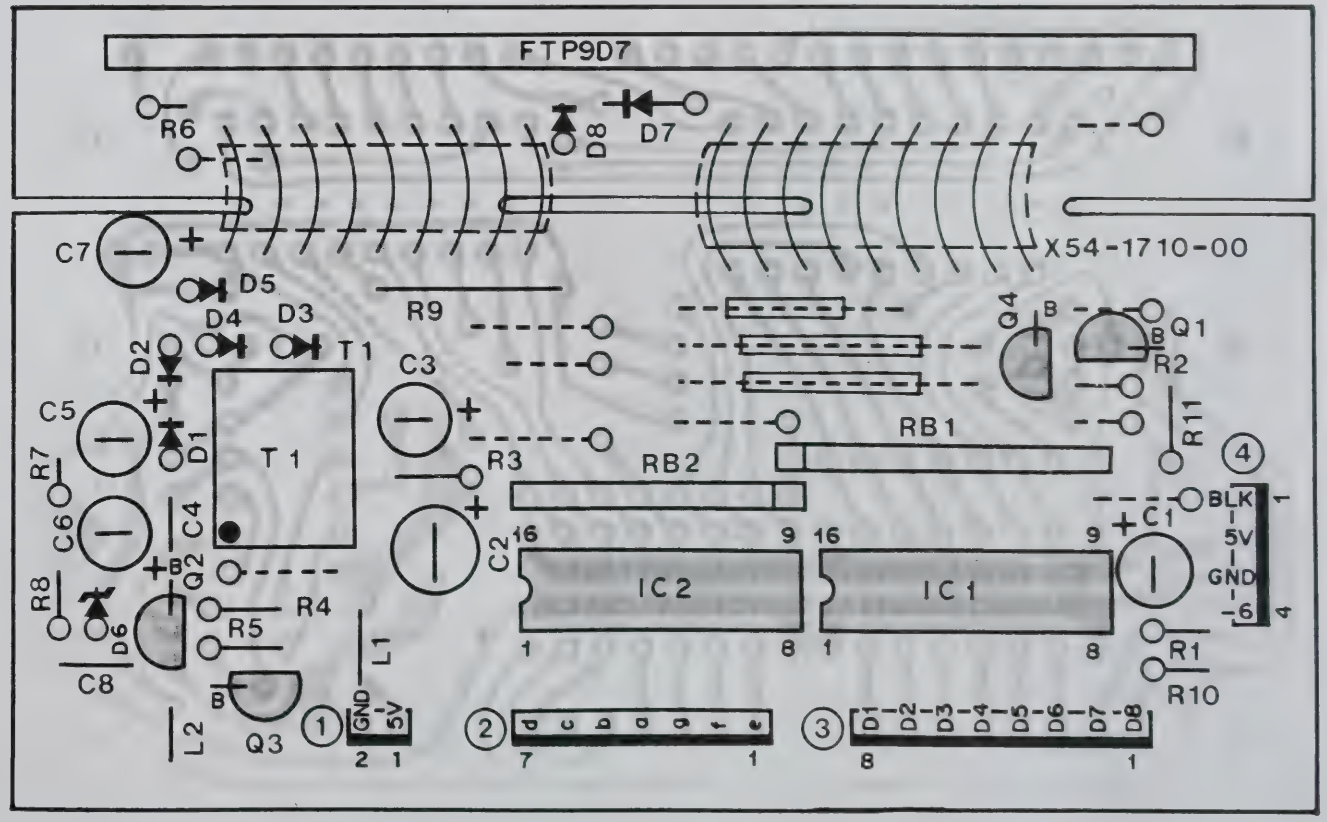
Q1 : 2SA1015(Y) Q2,3 : PN126S
D1,2 : LN66(R)
IC1 : LM358P

RELAY BOARD
Component side view



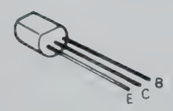
D1 : 1S1555

DISPLAY UNIT (X54-1710-00) Component side view

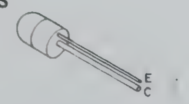


Q1,4 : 2SA1015(Y) Q2,3 : 2SC1959(Y)
D1–4,7,8 : 1S1555 D5 : RD9.1EB2 D6 : RD6.2EB2

2SC945
2SC1015
2SC1815
2SC1959

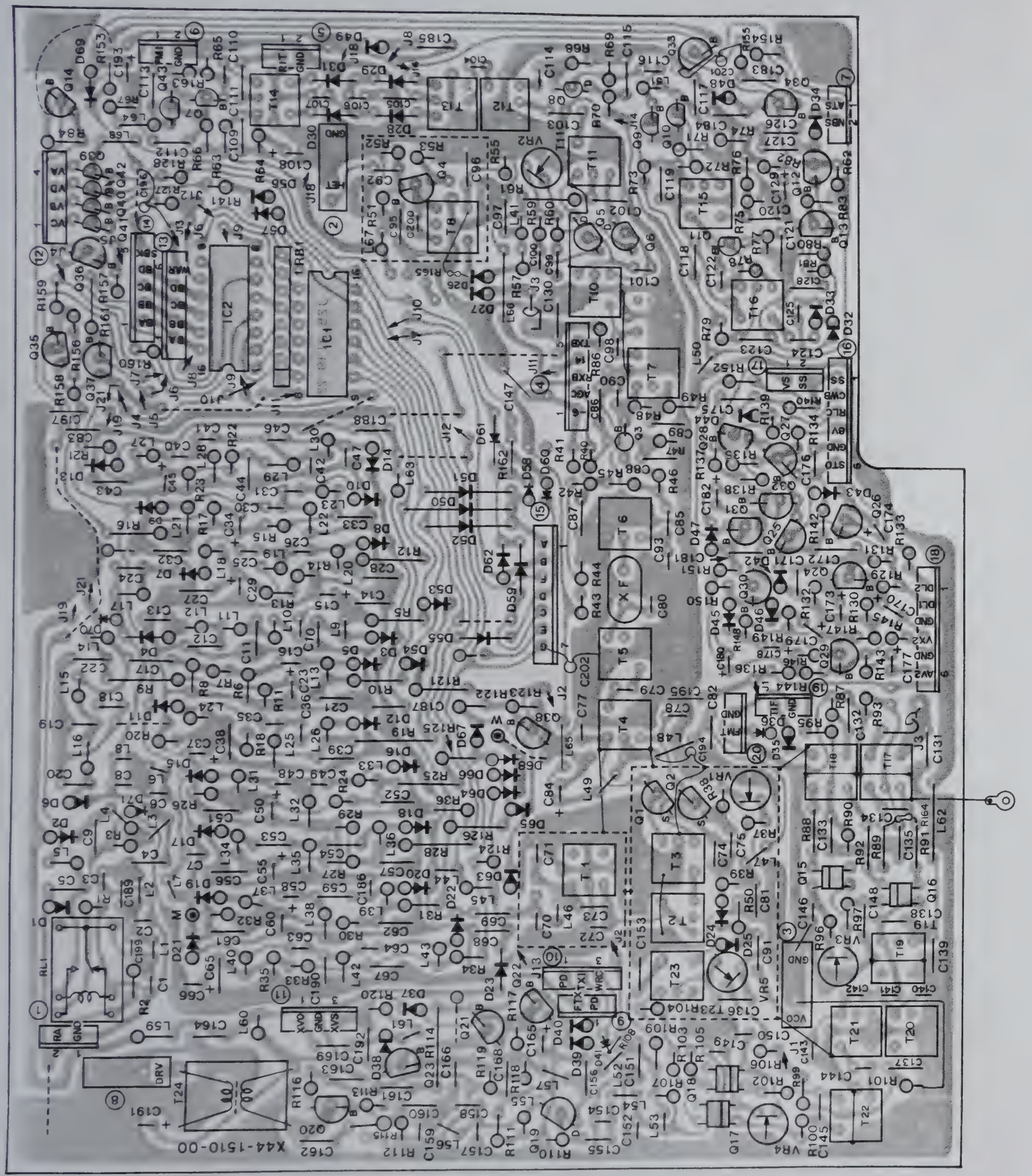


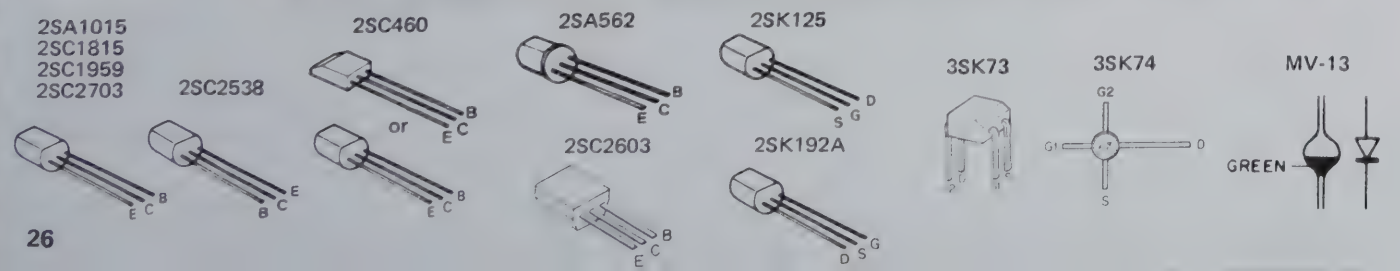
PN126S



TS-430S PC BOARD VIEW

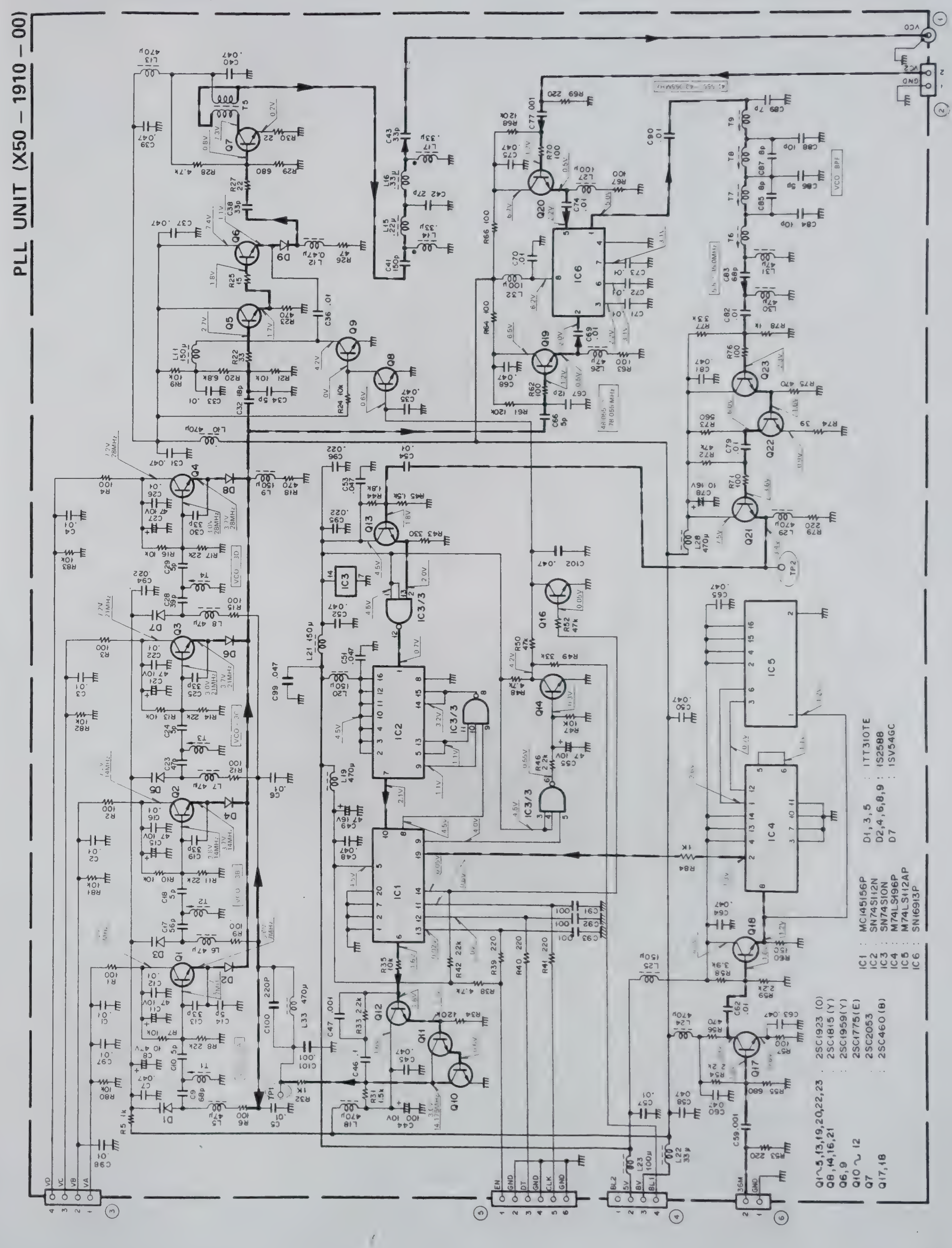
RF UNIT (X44-1510-11) Component side view





CIRCUIT DIAGRAM TS-430S

PLL UNIT (X50-1910-00)



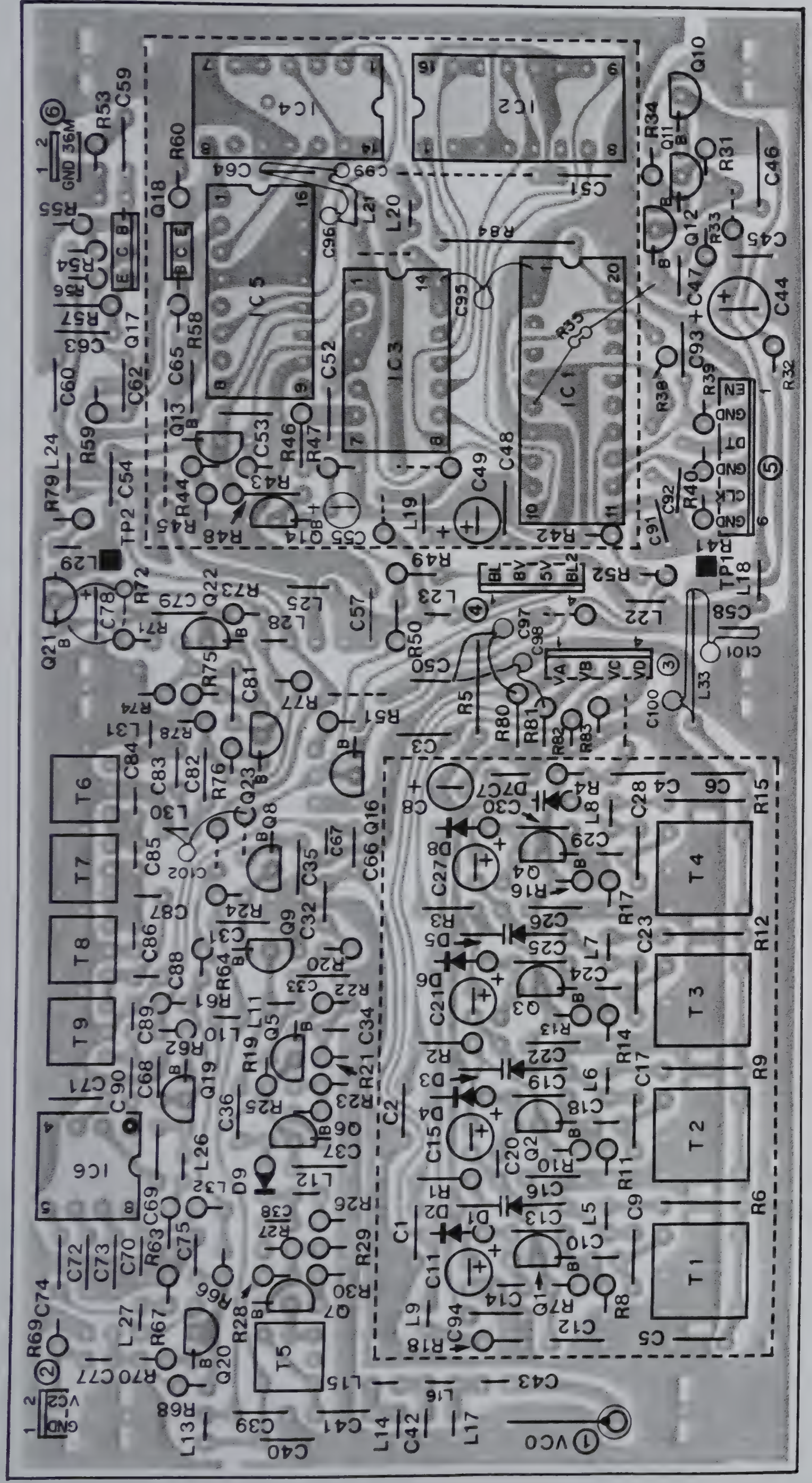
Q1～5,13,19,20,22,23 : 2SC1923 (O)
Q8,14,16,21 : 2SC1815 (Y)
Q6,9 : 2SC1959 (Y)
Q10 ～ 12 : 2SC1775 (E)
Q7 : 2SC2053
Q17,18 : 2SC460 (B)

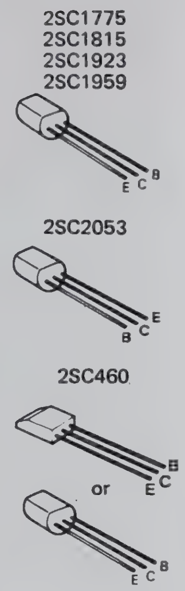
IC1 : MC145156P
IC2 : SN74S112N
IC3 : SN74S10N
IC4 : M74LS196P
IC5 : M74LS112AP
IC6 : SN16913P

D1,3,5 : ITT310TE
D2,4,6,8,9 : 1S2588
D7 : 1SV54GC

TS-430S PC BOARD VIEW

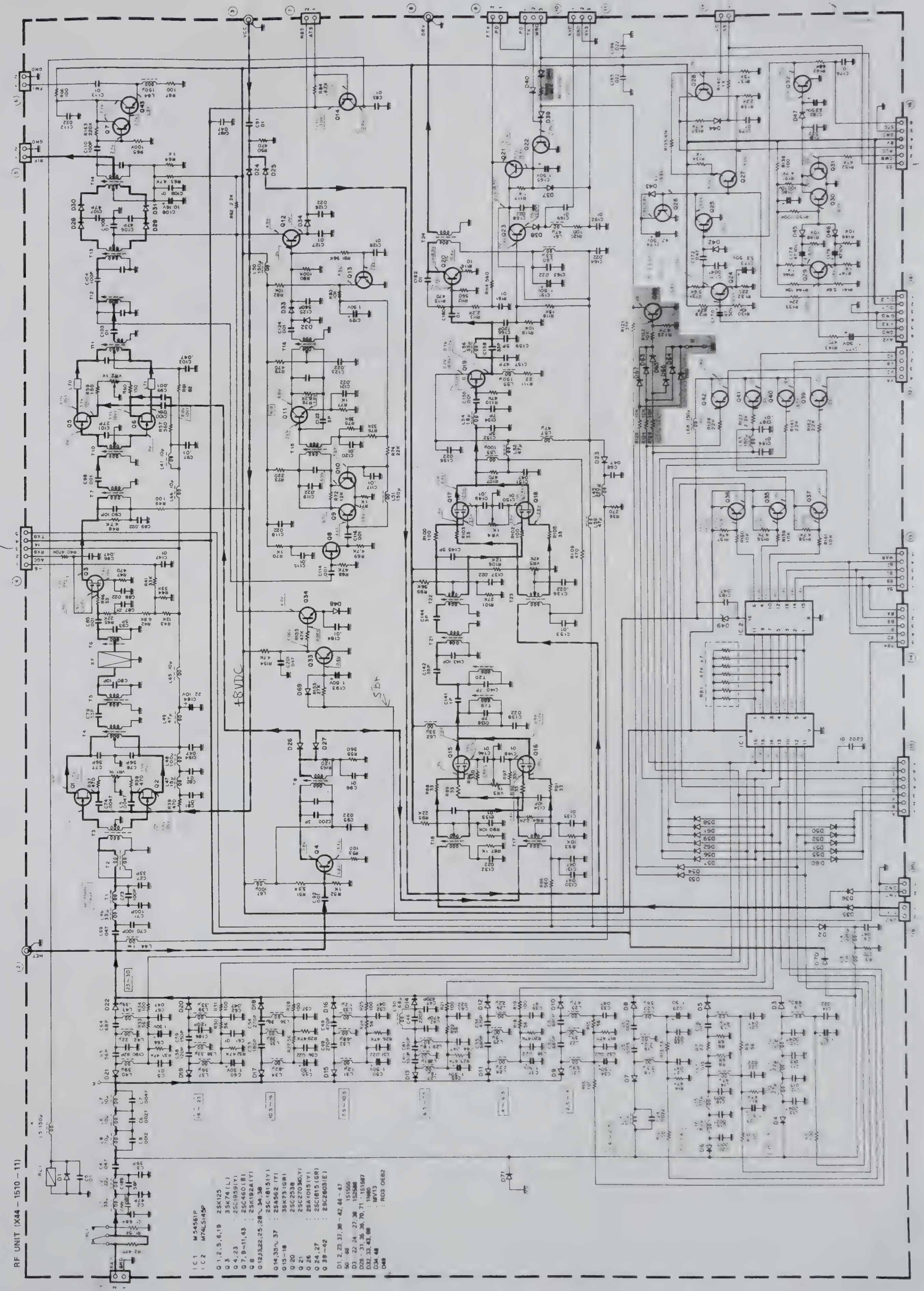
PLL UNIT (X50-1910-00) **Component side view**





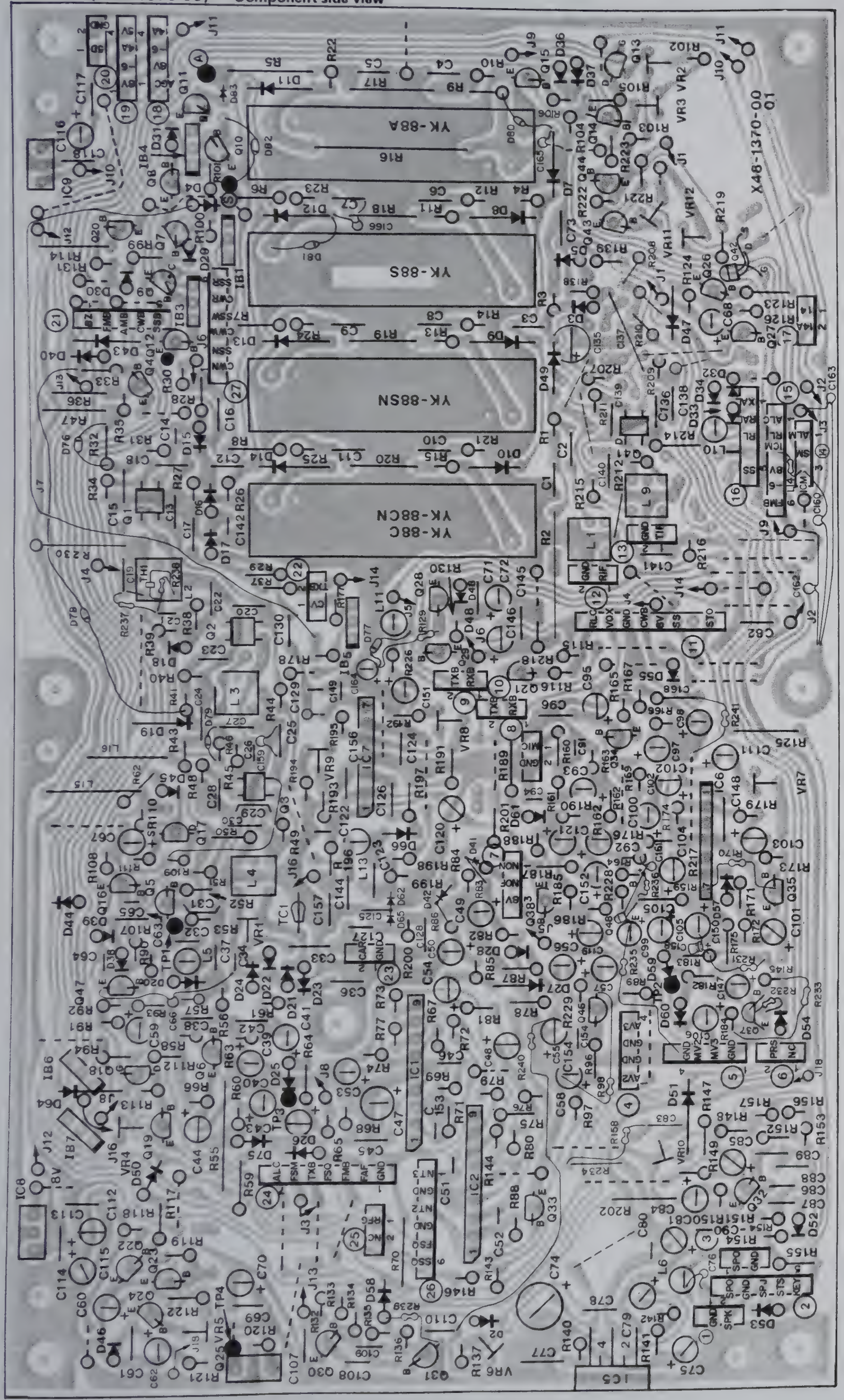
CIRCUIT DIAGRAM TS-430S

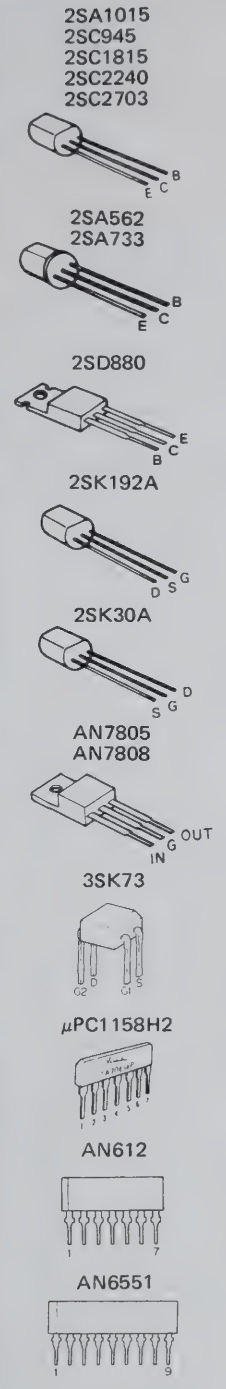
RF UNIT (X44-1510-11)



TS-430S PC BOARD VIEW

IF UNIT (X48-1370-00) Component side view





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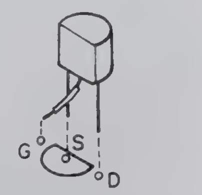
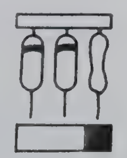
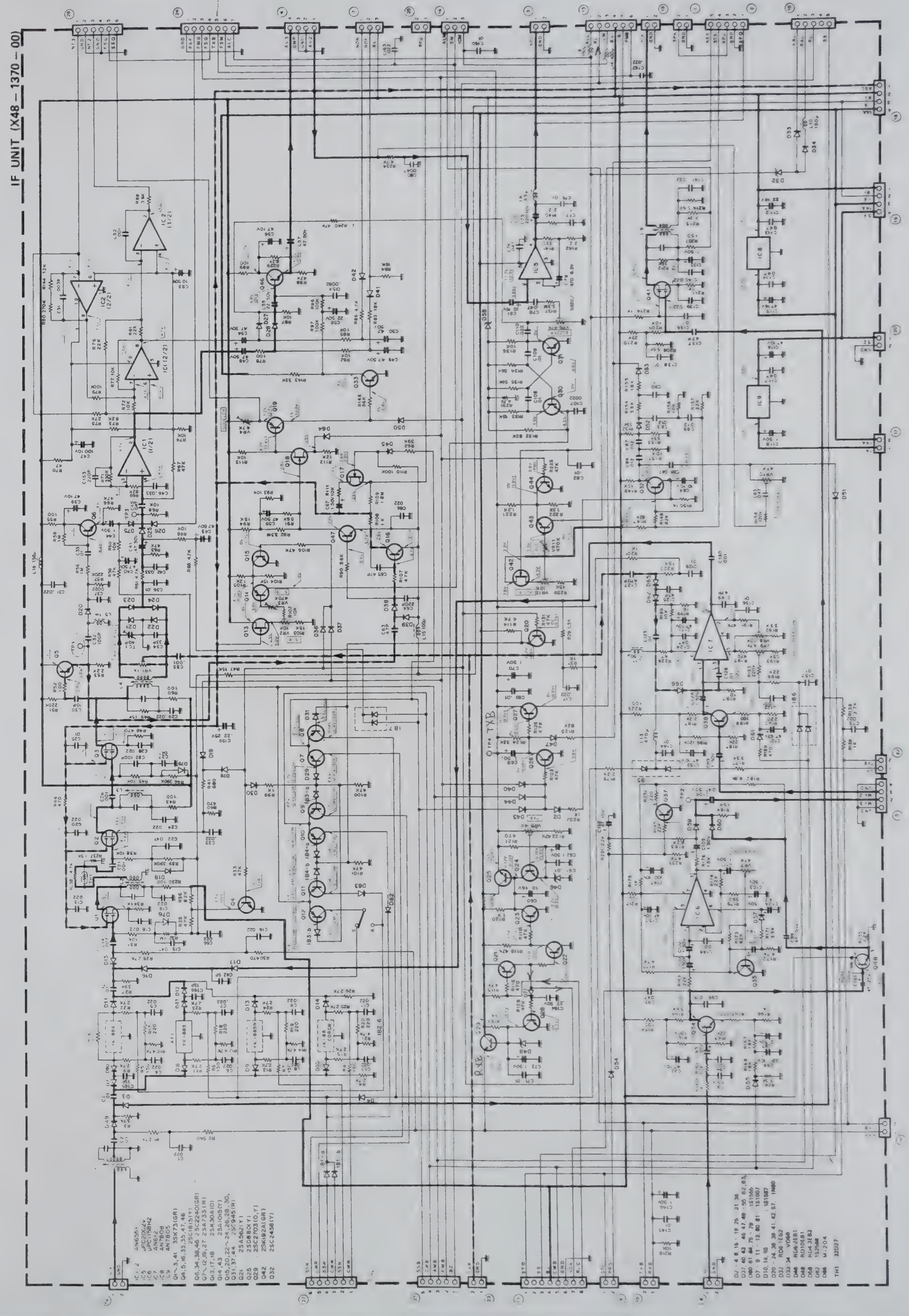


<Attachment direction of Inline Block>



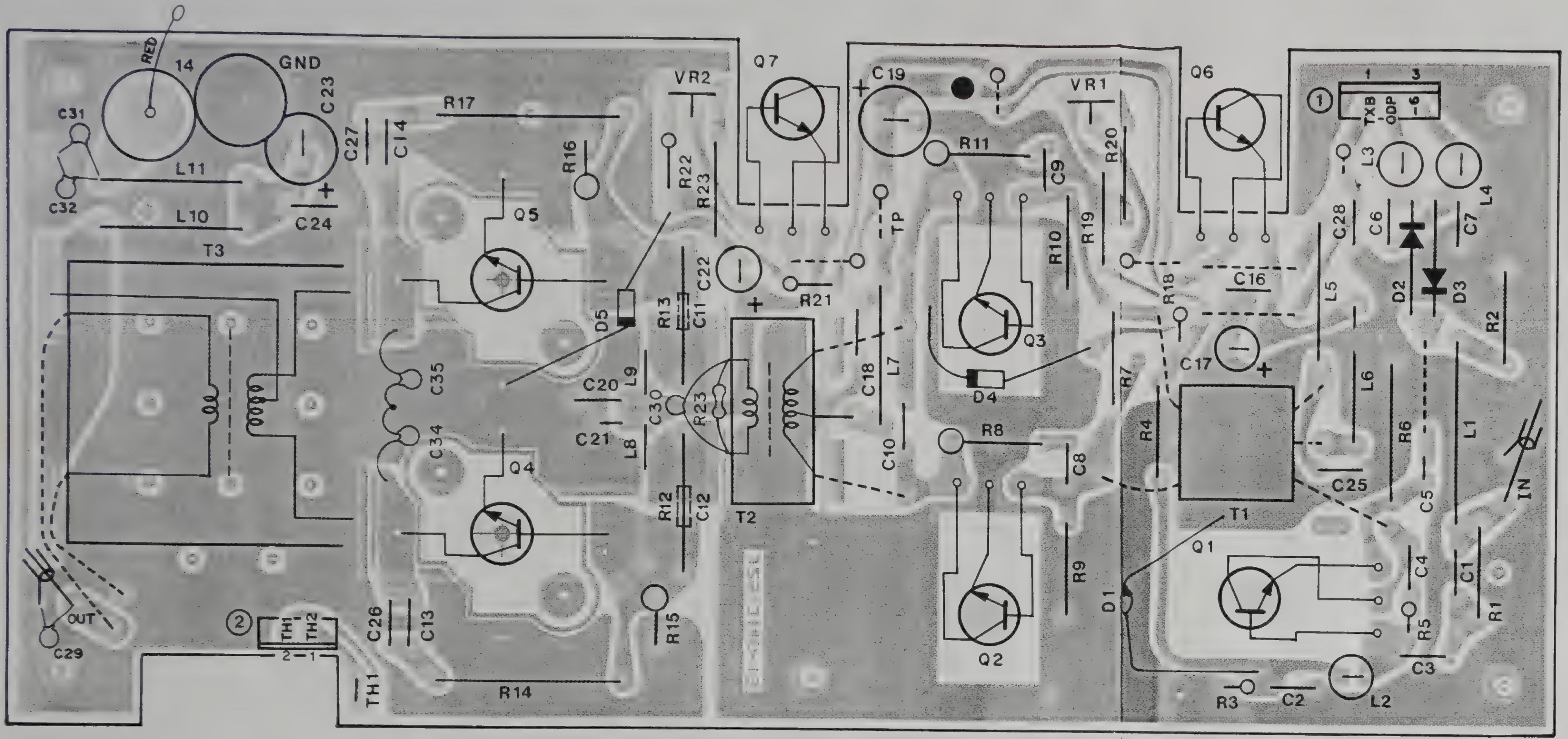
CIRCUIT DIAGRAM TS-430S

IF UNIT (X48-1370-00)



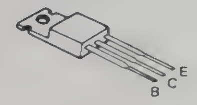
TS-430S PC-BOARD VIEWS

100W FINAL UNIT (X45-1280-00) Component side view

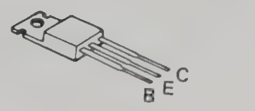


Q1 : 2SC2075   Q2,3 : 2SC2509
Q4,5 : 2SC2290*J   Q6,7 : 2SD880(Y)
D1 : MV-5T   D2,3 : 1N60   D4,5 : SV03Y
TH1 : SDT1000F

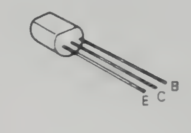
2SC2075
2SD880



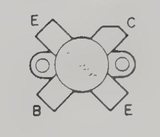
2SC2509



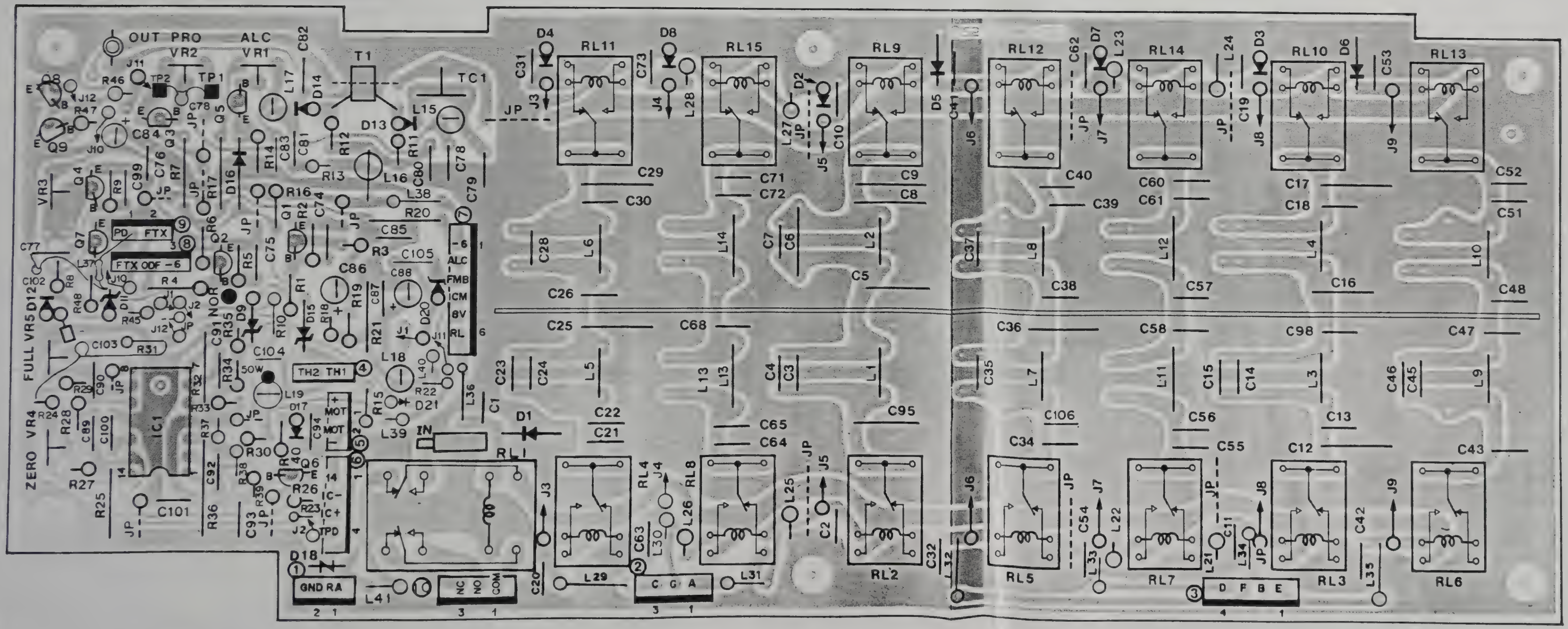
2SC1815
2SC1959



2SC2290*J

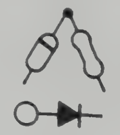


FILTER UNIT (X51-1290-00) Component side view



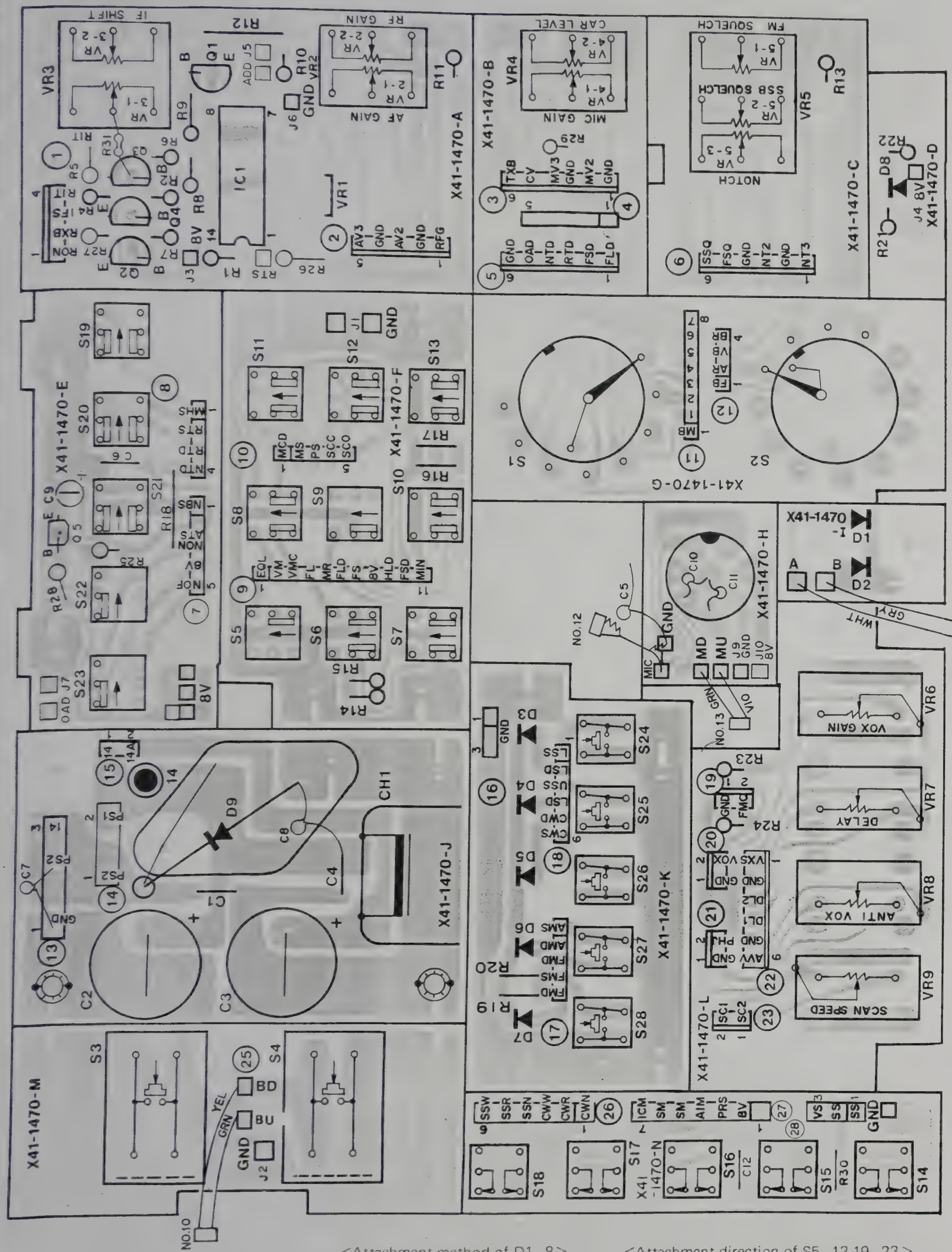
Q1–5,7–9 : 2SC1815(Y)   Q6 : 2SC1959(Y)
D1–8,12,17,21 : 1S1555
D9,11,15,20 : RD9.1EB3   D13,14 : 1N60
D16 : RD4.3EB3   D18 : ERZD03DK331
IC1 : MB3614

<Attachment method of D21,L40>



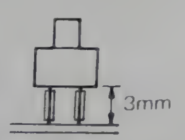
TS-430S PC BOARD VIEW

SWITCH UNIT (X41-1470-00) Component side view

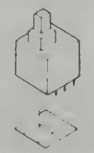


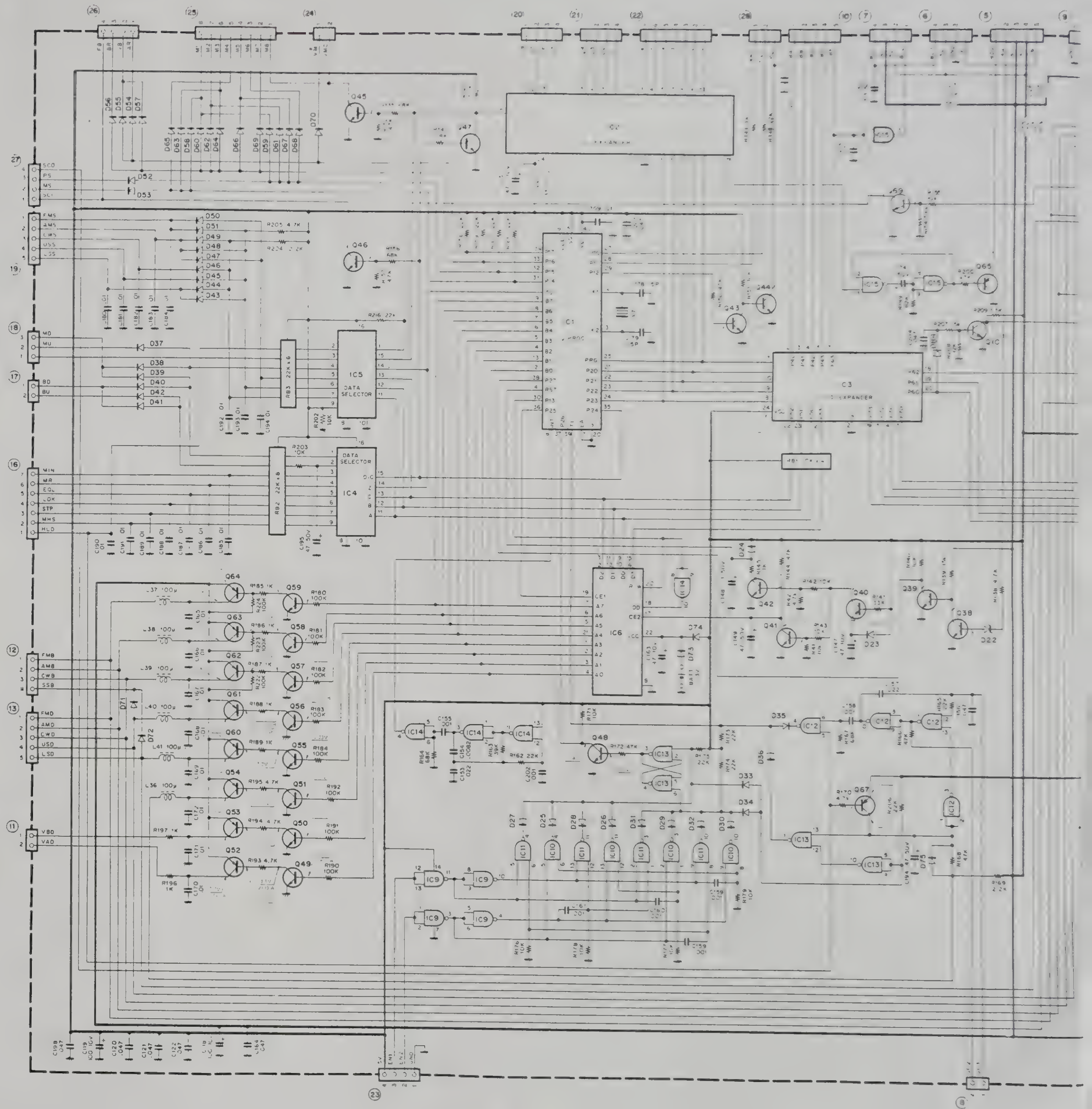
Q1–4 : 2SC945(R) Q5 : 2SC1815(Y)
D1,2,6–8 : SY438D D3–5 : SG238D D9 : S31C(S)
IC1 : TC4011BP

<Attachment method of D1–8>



<Attachment direction of S5–13,19–23>

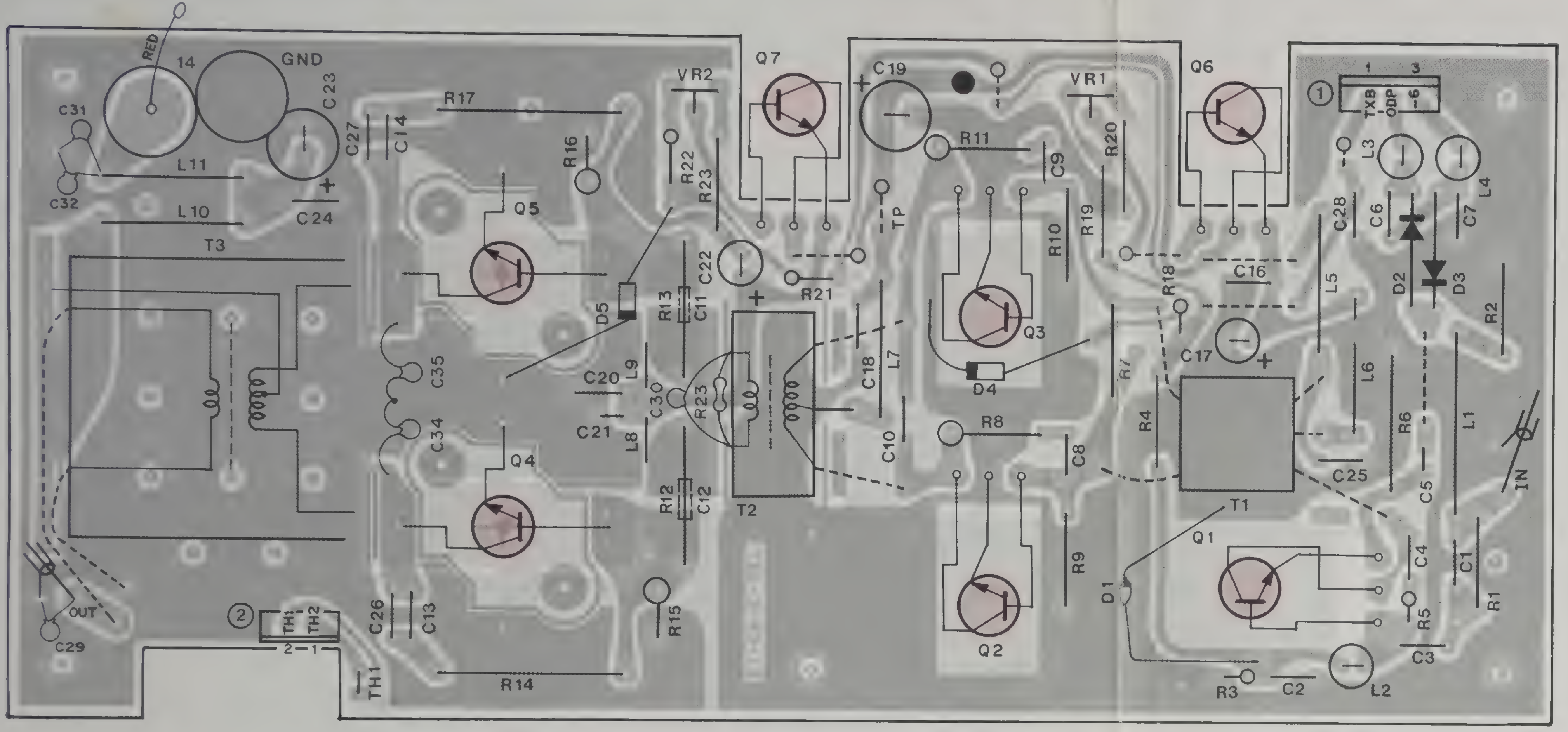




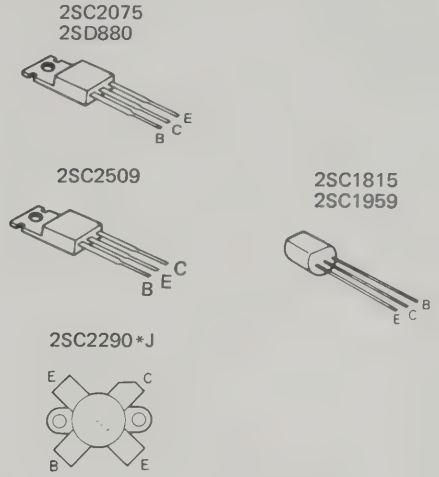
Disregard.
(See P33)

TS-430S PC BOARD VIEWS

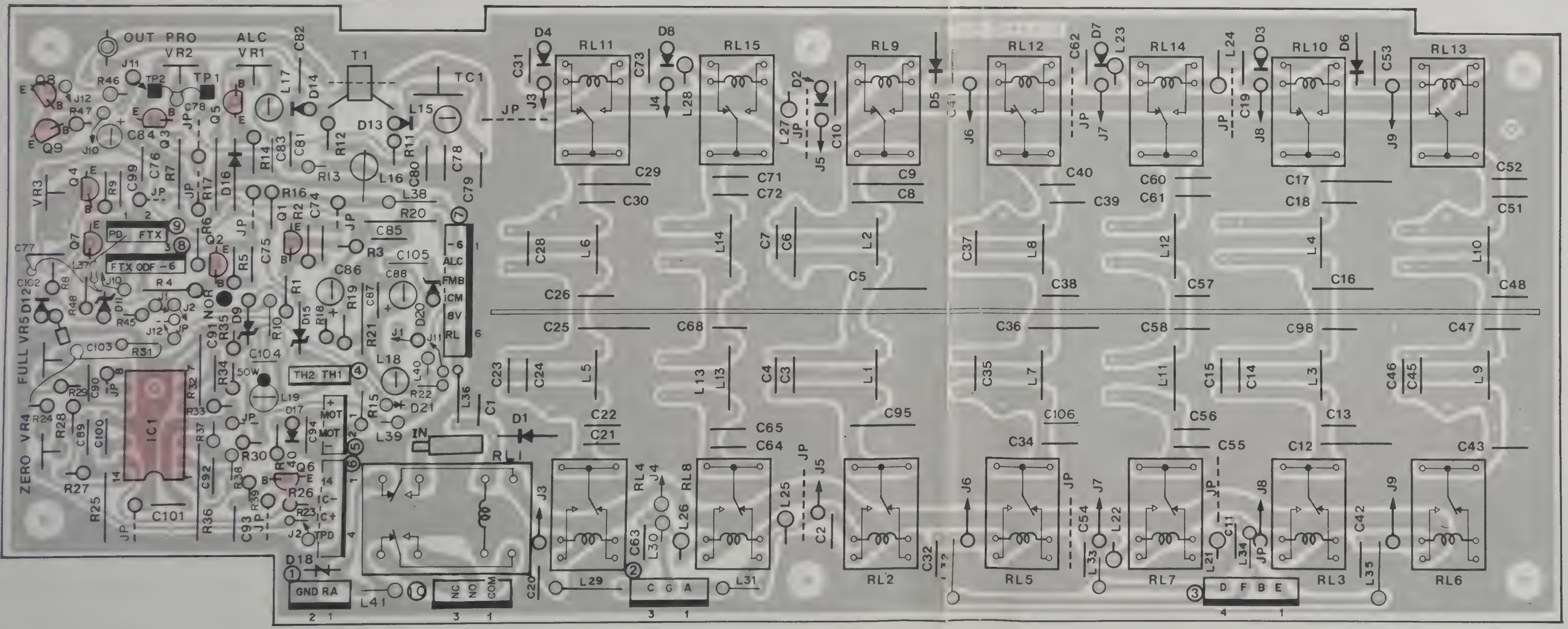
100W FINAL UNIT (X45-1280-00) Component side view



Q1 : 2SC2075 Q2,3 : 2SC2509
Q4,5 : 2SC2290∗J Q6,7 : 2SD880(Y)
D1 : MV-5T D2,3 : 1N60 D4,5 : SV03Y
TH1 : SDT1000F

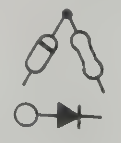


FILTER UNIT (X51-1290-00) Component side view

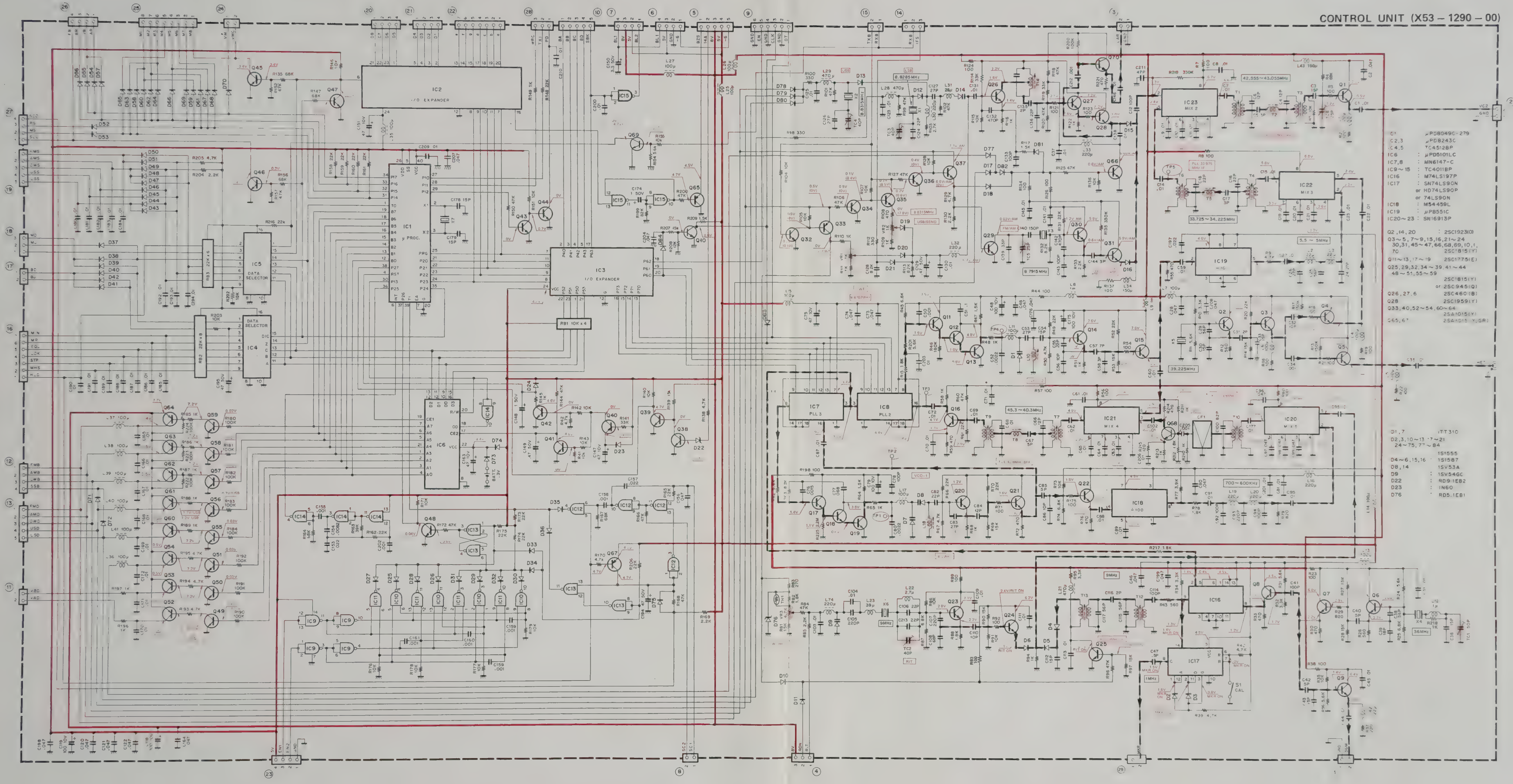


Q1–5,7–9 : 2SC1815(Y) Q6 : 2SC1959(Y)
D1–8,12,17,21 : 1S1555
D9,11,15,20 : RD9.1EB3 D13,14 : 1N60
D16 : RD4.3EB3 D18 : ERZD03DK331
IC1 : MB3614

<Attachment method of D21,L40>



CIRCUIT DIAGRAM **TS-430S**



Matter

(add p 26-32 one side)

CK

Master

(add p 26-32 ONE side)

CK

ORIG

NOTE: IF
ANY diagrams
missing
Check the
INSTRUCTION
Manual
FILE

CIRCUIT DESCRIPTION

OVERVIEW

The TS-430 is a transceiver and general-coverage receiver featuring double conversion at 48.055 and 8.830MHz intermediate-frequencies. Triple-conversion to 455kHz is used during FM receive operation. A microprocessor based 10Hz or 100Hz step switchable digital VFO system is employed for frequency control. The PLL system reference is a 36MHz master oscillator.

The following features are provided with the TS-430 : dual digital VFOs, 8 memory channels, memory scan, programmable band scan, IF shift, RIT, VOX, CW side tone, speech processor, NB, AF notch, squelch, F step, F lock, Mic UP/DWN.

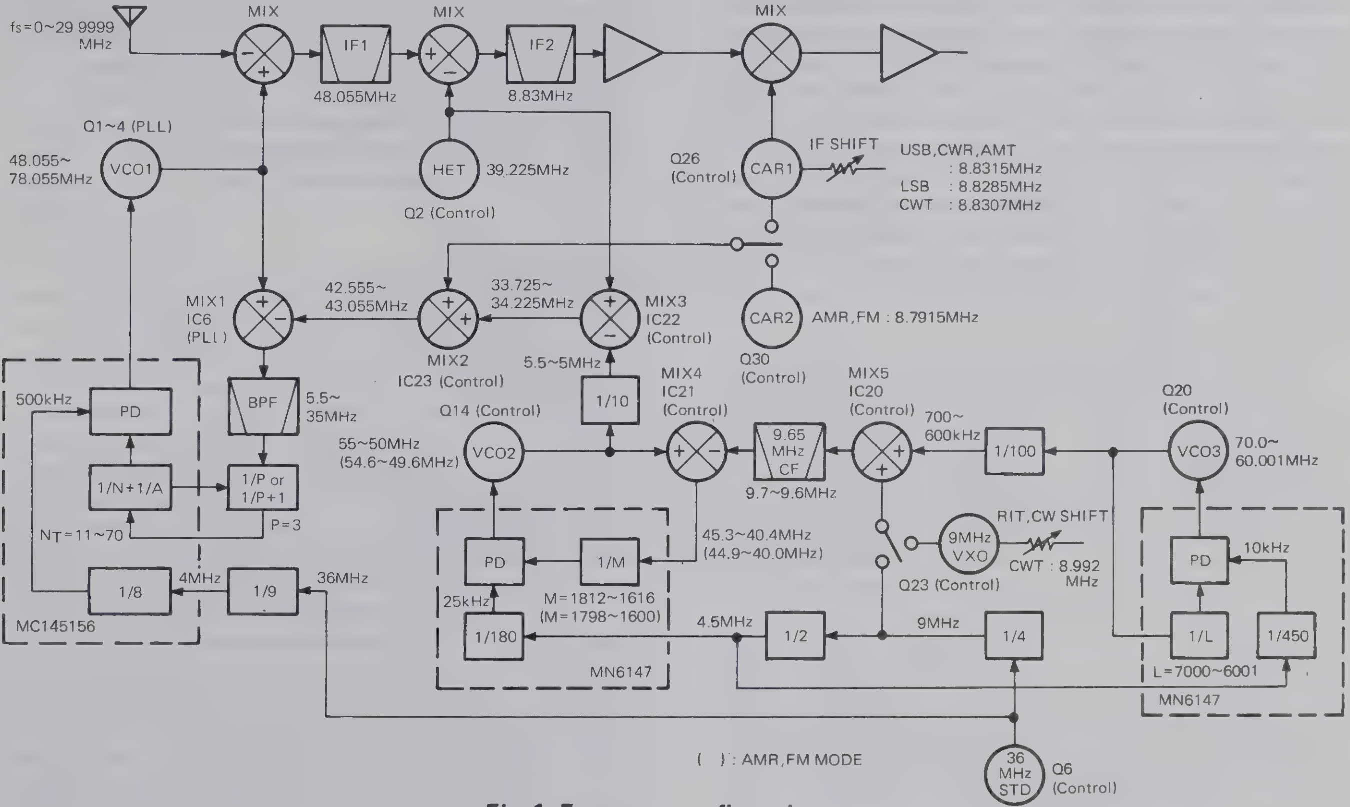


Fig. 1 Frequency configuration

RECEIVER CONFIGURATION

The TS-430 uses a double conversion receiver with a 48.055 MHz 1st intermediate frequency and 8.830MHz 2nd IF for SSB, CW, and AM modes. Triple conversion is used for the FM mode, in which the 3rd IF is 455kHz.

A signal from the antenna passes through one of seven LPF (Low Pass Filters) on the LPF unit, the antenna relay RL1, and enters the RF unit RA terminal. It then passes through the 20dB ATT (ATTENUATOR), controlled by Q14, a 30MHz LPF, the LPF for each band (a combination HPF and LPF for the 0.5 through 1.6MHz band), and the final LPF. The signal is then converted from an unbalanced to a balanced signal by broad-band transformer T2, and is mixed at Q1 & Q2 (JFET's) with the local oscillator signal from the PLL to arrive at the 48.055kHz 1st IF.

The signal passes through the MCF (Monolithic Crystal Filter), is post-amplified by Q3 (3SK74) and mixed at Q5, Q6 (2SK125), the 2nd balanced mixer with the 39.225MHz HET (Heterodyne) signal from the PLL to provide the 8.830MHz 2nd IF. A sample of the signal is picked off and amplified by the NB (Noise Blanker) chain (Q8--Q13). The main portion of this 2nd IF signal passes through the NB gate (D28—D31). The NB is also triggered by Q33, Q34 from a pulse signal supplies off the Control unit at PLL reset. This suppresses the "click" normally heard when one of the PLL loops resets. The signal is then fed to two outputs : one for the SSB, AM and CW modes, which is supplied to the IF unit, and the other, which is amplified by Darlington Pair Q7, Q43 and supplied to the (optional) FM unit. The signal supplied to the IF unit first passes through the MCF for the selected mode and is then amplified by three stages of IF amplification Q1—Q3 (3SK73 x 3). In the SSB and CW modes, the signal from the amplifiers is detected by the product detector D21—D24 (1N60 x 4).

The audio signal in any mode passes through the notch filter IC1 and IC2 (AN6551 x 2) and then the squelch-switching transistor Q46 (2SC2240) ; the output of the transistor is supplied to the AF GAIN control. Q47, Q18, Q19 and Q33 are the squelch control chain for all modes but FM. In the AM mode circuit, the IF output is amplified by Q5. The AGC buffer, and AM detected by D20 (1N60). Its output is fed to the notch filter via buffer amplifier Q6 (2SC2240). D38 and D39 are the AGC rectifiers, Q16 is the AGC amplifier, and Q17 is the AGC-slow time constant switch. Q13 and Q24 are the S meter amplifiers, while in the FM mode Q15 "kills" the IF unit S meter signal : The FM unit supplies the S meter signal during FM operation. In the FM mode, the RF unit FMI output is delivered to the FM unit, where the signal is input to Q5 : MC3357P, a monolithic IC containing the second conversion oscillator, mixer, limiting amplifier, quadrature discriminator, active filter, squelch, scan control, and mute. Q4 : 2SC2240 buffers the detected output and returns this audio signal (via the FAF line) to the IF unit, D26 switch.

FM signal meter drive (FSM) is derived through amplifiers Q6, Q7 : 2SC1815 (Y), transformer T3, and rectifiers D5, D6 : 1N60. The low level audio signal from the AF GAIN control is power amplified by IC5 (μPC2002V), and is then output to the speaker.

Item	Rating
Nominal center frequency	8830 kHz
Center frequency deviation	Within ±150 Hz at 6dB
Pass bandwidth	±1.2 kHz or more at 6dB
Attenuation bandwidth	±1.5 kHz or less at 20dB ±2.2 kHz or less at 60dB ±3.0 kHz or less at 80dB
Ripple	20dB or less
Insertion loss	6dB or less
Guaranteed attenuation	80dB or more within ±3kHz to 1MHz
Input and output impedance	600Ω//15pF

Table 1 MCF (L71-0208-05) YK-88S (IF unit XF1)

Item	Rating
Nominal center frequency	48.055MHz±1 kHz
Pass bandwidth	±9.6 kHz or more at 3dB
Attenuation bandwidth	±28 kHz or less at 10dB
Lipple	0.7dB or less
Insertion loss	2dB or less
Guaranteed attenuation	30dB or more within ±1MHz
Input and output impedance	2kΩ±10%

Table 2 MCF (L71-0214-05) (RF unit XF)

Item	Rating
Center frequency fo	8830.7kHz
Center frequency deviation	fo ±150Hz at 6dB
6dB bandwidth	±250Hz or more
60dB bandwidth	±900Hz or less
Ripple	2dB or less
Loss	6dB ±2dB
Guaranteed attenuation	80dB or more within fo ±2kHz to ±1MHz
Input and output impedance	600Ω/15pF

Table 3 CW crystal filter YK-88C (L71-0211-05) Option

Item	Rating
Center frequency fo	8830.7kHz
Center frequency deviation	fo ±50Hz at 6dB
6dB bandwidth	±125Hz or more
60dB bandwidth	±600Hz or less
Ripple	2dB or less
Loss	8dB ±2dB
Guaranteed attenuation	80dB or more within fo ±2kHz to ±1MHz
Input and output impedance	600Ω/15pF

Table 4 CW crystal filter YK-88CN (L71-0221-05) Option

Item	Rating
Center frequency fo	8830kHz
Center frequency deviation	8830kHz ±150Hz at 6dB
6dB bandwidth	±900Hz or more
60dB bandwidth	±1800Hz or less
Guaranteed attenuation	80dB or more within fo ±2.5kHz to ±1MHz
Ripple	2dB or less
Loss	3dB ±2dB
Input and output impedance	600Ω/15pF

Table 5 SSB crystal filter YK-88SN (L71-0220-05) Option

Item	Rating
Center frequency (fo)	8831.5 kHz±250 Hz
−6 dB bandwidth	6 kHz
Attenuation bandwidth	11 kHz
Guaranteed attenuation	80 dB or more
Ripple	2 dB or less
Loss	3 dB±2 dB
Input and output impedance	600Ω//15pF
Temperature	−10°C~+50°C

Table 6 AM crystal filter YK-88A (L71-0223-05) Option

CIRCUIT DESCRIPTION

TRANSMITTER CONFIGURATION

This transceiver uses a dual conversion transmitter for all operating modes. The audio signal from the microphone is delivered to the IF unit X48-1370-00 for preamplification by Q34, 2SC2240GR. The output from this stage is routed to three circuits. The amplified audio signal continues either to the microphone gain control through emitter follower Q48, 2SC1815Y, or at processor ON, through IC6, μPC1158H2, the processor audio amplifier. Q35 2SC1815Y is the processor AGC amplifier, and establishes the degree of compression, while Q37, 2SC945R is a switch, operated at processor ON, which interrupts the normal, non-processed signal flow. The secondary destinations of Q34's output are the VOX circuit input, and the (optional) FM unit microphone input.

Returning from the microphone gain control, the audio signal is amplified by Q38, 2SC2240GR, and input to the balanced modulator IC7, AN612, along with the 8.8MHz carrier signal developed on the Control unit. In the AM mode, the modulator is unbalanced to output a modulated carrier, while in the CW mode, the modulator is unbalanced and amplifier Q38 is disabled to yield only a controlled carrier (D66, Pin Diode) from IC7. This signal is diode switched (D17, D16, D3) through the 8.8kHz MCF (Monolithic Crystal Filter), and thence to the TX IF amplifier Q41, 3SK73GR. Q27 is the CW keying transistor used to control Q41's operating voltage. ALC is also applied to Q41. Q42 and Q43 are the ALC meter amplifiers, while Q44 "kills" the SSB, CW or AM ALC during FM mode operation. Q32 is a phase-shift audio oscillator supplying sidetone in the CW mode.

The signal then exits the IF unit and is sent to the RF unit via the TIF line. On the RF unit X44-1510-11, the signal is up-converted, mixed with the VCO (voltage controlled oscillator) output, then amplified and sent on to the Final Amplifiers. Q15 and Q16, 3SK73GR are the HET (heterodyne) mixers. The 39.225MHz HET injection signal originates on the Control unit, and is amplified by Q4, 2SC1959Y. In the FM mode, the TIF signal is diode switched off (D35), while the FM unit transmit signal output (FMT) line is switched on (D36) into the HET mixers. In the FM mode, the audio signal from the Switch unit "L" goes to the FM unit via the FMC line. In the FM-430 unit, the MIC signal is amplified and limited by Q1 : TA7061AP, an OP AMP, and is applied to varicap diode D1 : 1S2208 to modulate crystal X1.

The 8831.5kHz carrier output generated by oscillator Q2 (2SC460) and amplified Q3 (3SK74) is fed via the FMT line back to the RF unit (connector 20) and into the transmitter balanced mixers (Q15, Q16 : 3SK74).

The output of this mixer stage is filtered and immediately mixed with the VCO output by Q17 and Q18, 3SK73GR. The VCO signal also originates on the Control unit. Q19, 2SK125 is a source follower, which feeds Q20, 2SC2538, the pre-driver amplifier. The Drive signal is then sent to the Final unit for amplification.

During XVRTR (transverter) operation, Q23, 2SC1959Y operates as an emitter follower from Q19, supplying a low level transmitter signal output through the XVRTR port. At the same time, Q21, 2SC2703 turns off Q20 to interrupt the normal transmitter signal flow from the RF to the Final unit.

In the Final unit X45-1280-00, the signal is amplified by Q1, 2SC2075, then push-pull amplified by Q2 and Q3, 2SC2509. Q4 and Q5 2SC2290 are the final push-pull amplifiers. D4 and Q6 are the driver bias control elements, and D5 and Q7 are the final transistor bias circuit. The Final unit output is then sent to the Filter unit.

In the Filter unit X51-1290-00, the transmitter output is filtered by one of seven filter circuits, automatically selected from the Control unit. ALC and SWR protection sensing are provided by T1, a toroidal directional coupler, and Q3 and Q5, 2SC1815Y.

RECEIVER ANCILLARY CIRCUITS

NOTCH CIRCUIT

IC11 and IC2 in the IF unit constitute a Bi-Quad filter circuit. The notch frequency is determined by the following two formulas.

(1) $f_N = \sqrt{R6}/2\pi\sqrt{R3 \cdot R5 \cdot R1 \cdot C1 \cdot C2}$

(2) $R1 \cdot R6 = R4 \cdot R7$

If a variable resistor is used for resistor R3, the notch frequency can be controlled according to formula (1). The notch frequency range is from 350 to 2800Hz, and attenuation is from 25 to 50dB. The correlation between the formula and circuit diagram resistor & capacitor values is :

R1 = R80
C2 = C52
R8 = R77
C1 = C51
R4 = R75
R2 = R81
R3 = R88 + Notch control
R1 = R79
R5 = R76

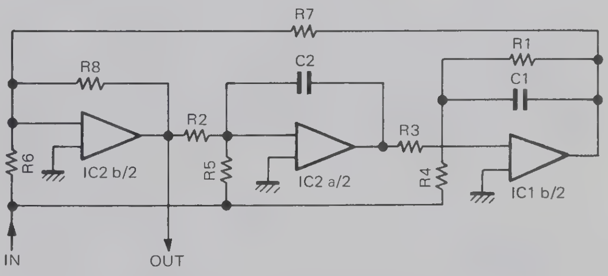


Fig. 2 Theoretical circuit diagram

CIRCUIT DESCRIPTION

TRANSMITTER ANCILLARY CIRCUITS

PROTECTION CIRCUTS

The transmitter output circuit is triple-protected.

- **VSWR Protection**

Reflected power detected by current transformer T1 is rectified by diode D3, amplified by transistor Q3 and added to the ALC circuit. When the VSWR is high, the ALC circuit reduces the drive signal into the power amplifiers.

- **Heat Sink Temperature Protection**

Thermister TH1, mounted on the Final unit heat sink is connected to the inverting inputs of comparators IC1 sections c & d. If the thermistor resistance decreases, due to an excessive increase in heat sink temperature, comparator "d" turns on before comparator "c" since "d's" reference voltage is established higher than that of section "c's". Comparator "d's" output turns on Q6 which starts the fan motor. If the heat sink's temperature continues to rise, due, for example, to continuous transmission or an incorrect load, comparator section "c" turns on Q1 to add a negative D.C. voltage to the ALC circuit. The ALC circuit then forcibly curtails the drive input to the Final unit.

The comparator reference voltages are established for fan turn-on at approximately 65°C, and drive shut-down at approximately 90°C. The fan stops at 60°C because of the hysteresis provided for comparator section "d".

- **Protection using RF voltage**

The transmitter may be overdriven, although the VSWR is not particularly high, depending on the load connected to the antenna terminal. Excessive drive power could exert stress on the Final unit driver transistor 2SC2509. To protect the driver transistor, RF voltage at the emitter of pre-driver 2SC2075 is rectified, amplified by Filter transistor Q2, and added to the ALC circuit. When the RF voltage at the pre-driver is excessive, the ALC circuit reduces the drive power.

VOX (Voice Operated Transmit)

The VOX circuit is contained on the RF unit, Q24 is the VOX amplifier. Q25 & Q26 supply VOX delay. Q27 & Q28 are a Schmitt Trigger used to control RX & TX voltage switching. The speaker-derived ANTIVOX signal is amplified by Q29, Q30 & Q32 and is applied to Q25 to hold-off the VOX from keying on speaker output. In the CW mode, ANTIVOX is disabled by Q31.

PLL CIRCUIT

The TS-430 PLL circuit consists of three phase locked loops and a 36MHz master oscillator to generate all reference frequencies. PLLs 2 & 3 are on the Control unit, and PLL 1 is on the PLL unit. PLL3 uses an MN6147 (IC7) which contains a phase comparator, programmable frequency divider and frequency divider for generating the reference frequency. This IC uses a 10kHz reference frequency, and controls VCO3 to generate frequencies from 70 to 60MHz in 10kHz steps. The 36MHz signal is divided by 8 to 4.5MHz before it is input to PLL3. In PLL3, the 4.5MHz signal is divided by 450 to generate the 10kHz reference signal. The microcomputer (IC1) applies 4-bit serial program data, plus 1 clock data bit to the programmable divider to vary the division ratio from 1/7000 to 1/6001.

The 70 to 60MHz signal generated by VCO3 (Q20 : 2SC1923) is divided by 100 by IC18 (M54459L) to obtain output from 700 to 600kHz. The result is then mixed with the 9MHz reference signal by MIX5 (IC20 : SN16913P) to produce a 9.7 to 9.6MHz signal which is applied to MIX4 (IC21) through a ceramic filter.

PLL2 also uses an MN6147 (IC8). This IC uses 25kHz as its reference frequency and controls VCO2 (Q14) to generate frequencies from 55 to 50MHz. The signal output by VCO2 is mixed with the 9.7 to 9.6MHz signal generated by PLL3 in MIX4 (IC21 : SN16913P) to obtain a 45.3 to 40.4MHz signal, which is applied to the programmable divider in the PLL IC (IC8). The programmable divider uses a division ratio from 1/1812 to 1/1616. Since the divisor is changed in 4 steps, the VCO2 output signal frequency varies from 55 to 50MHz in 100kHz steps.

VCO2 output is divided by 10 at IC19 (μPB551C), then mixed with the 39.225MHz heterodyne signal by MIX3 (IC22 : SN16913P). The resultant 33.725 to 34.225MHz signal (varied in 10Hz steps) is mixed with the 8.83MHz carrier by MIX2 (IC23 : SN16913P) to generate the 42.555 to 43.055MHz signal which is applied to the PLL unit, MIX1 (IC6) in the PLL1 loop. PLL1 uses 4 VCOs (Q1–Q4) to generate the 48.055 to 78.055MHz VCO signal. It uses an MC14156P PLL IC (IC1) and SN74LS112N (IC2) as a swallow (High Speed) counter (with a division ratio of 1/3 or 1/4). the 36MHz reference signal is divided by 9 at IC5 (M74LS112AP) and IC4 (M74LS196P) to obtain a 4MHz signal, and this 4MHz signal is applied to IC1, where it is divided by 8 to obtain the 500kHz reference signal.

The 48.055 to 78.055MHz signal generated by VCO1 is mixed with the signal from PLL2 by MIX1 (IC6) to generate the 5.5 to 35MHz signal. This signal is applied to the programmable divider in the PLL IC (IC1) through the swallow counter. The microprocessor outputs 3-bit serial data to vary the division ratio (N) from 11 to 70. Thus, PLL1 operates as a PLL using a 500kHz reference signal.

Item	Rating
Nominal center frequency (*fo*)	9.65MHz
3dB Attenuation bandwidth	*fo*±80kHz or more
Insertion loss	6dB or less $20\cdot\log\left(\frac{E1}{2E2}\right)$
Guaranteed attenuation at 9MHz	40dB or more
Spurious (within 9.65+2MHz) (within 9.65−2MHz)	30dB or more 35dB or more
Voltage capacity	DC50V 1minute
Input and output impedance	330Ω

Table 7 Ceramic filter (L72-0336-05)
(Control unit CF1)

CIRCUIT DESCRIPTION

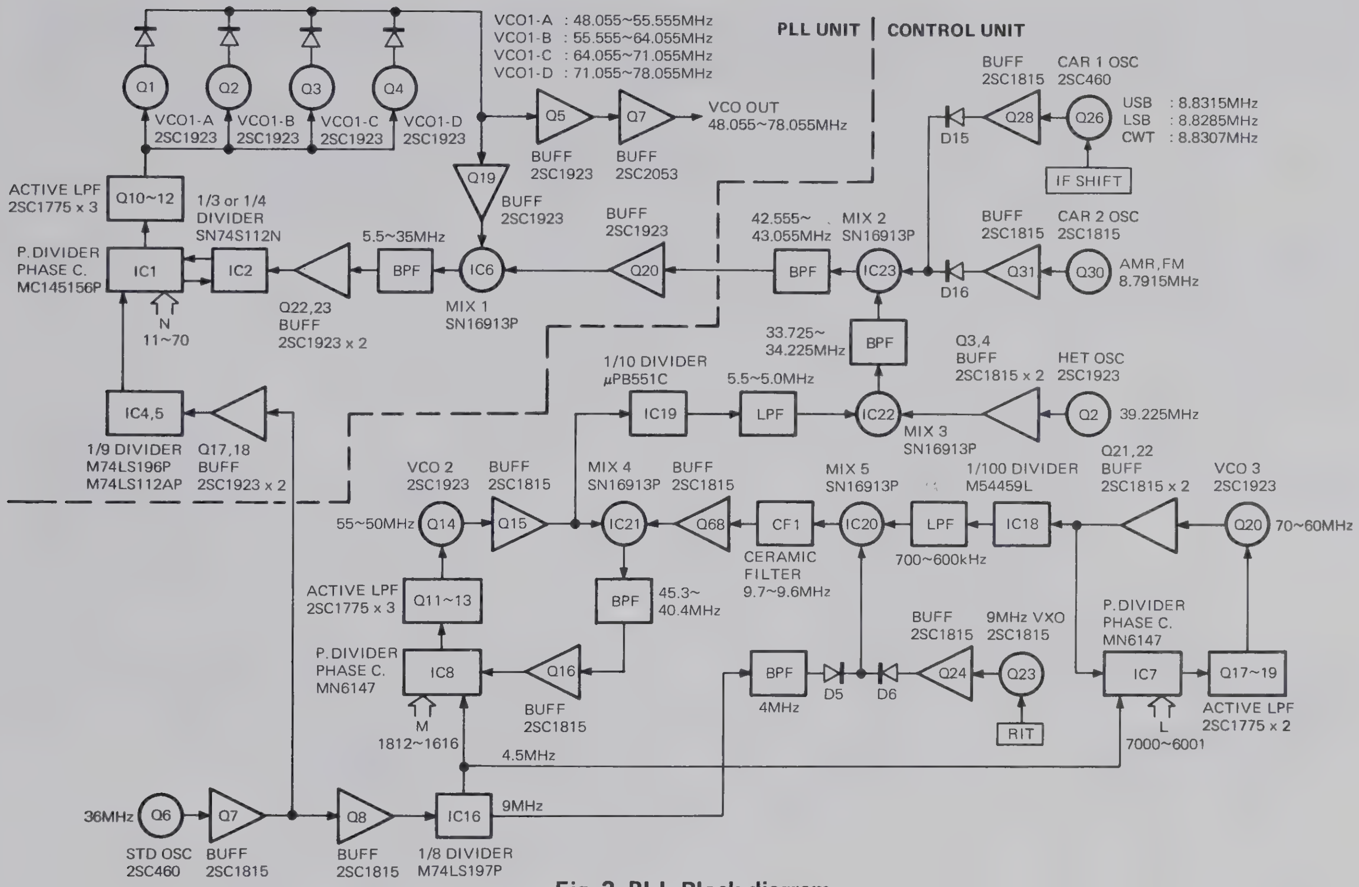


Fig. 3 PLL Block diagram

DIGITAL CONTROL CIRCUIT

The TS-430 digital Control unit consists of a µPD8049C-279 8-bit microcomputer (IC1), 2 I/O expanders, 2 data selectors, a C-MOS RAM IC for memory and a diode matrix for interfacing.

The MODE SW, BAND SW, M-IN, MR, A=B, HOLD, STEP, MIC UP/DOWN and LOCK switches are connected to the data selectors (IC4 and IC5 : TC4512BP) either directly or through the diode matrix so that the setting of each switch is input to the microcomputer as 1 data bit. The FUNCTION, MEMORY CH, MS and PG.S SW switches are also connected to the microcomputer through the diode matrix. Thus, the settings of these switches are input to the microcomputer as 4 data bits.

I/O expander IC3 (µPD8243C) is used to output the frequency division data for the PLLs and the band data. The frequency division data is changed only when the frequency is changed. The frequency range from 0 to 30MHz is divided into 10 band segments, and these segments are selected by band data which is output as 4-bit BCD code. The other I/O expander (IC2) outputs frequency data for the 7-segment display and the digit dynamic drive signal. The clock signal used to dynamically drive the display is generated by astable multivibrator IC14 (TC4011BP), which oscillates at approximately 1 kHz.

The encoder interface circuit (consisting of IC9, IC10 and IC11 [TC4011BPs]) multiplies the 250 pulses/rev. 2-phase clock signal generated by the encoder unit by 4 to obtain a 1000 pulses/rev. clock signal which is applied to the microcomputer. The relationship between the phases is detected by IC13 to determine the tuning knob direction of rotation, and this directional data is applied to the microcomputer as the UP/DOWN signal.

The microcomputer clock signal input terminal is also used to input the speed control data for program scan. A clock signal generated by astable multivibrator IC12 (TC4011BP) is applied to this terminal in the program scan mode. The frequency of this multivibrator can be varied from 50 to 250 Hz by the slide potentiometer located on the top panel.

The memory backup circuit uses a C-MOS RAM (IC6 : µPD5101LC) and a 3V lithium battery. The microcomputer monitors the main power supply voltage using a circuit consisting of D22 (RD9.1EB2) Q38 and Q39 (2SC1815s). When the voltage (normally 13.8V DC) drops below about 9.5V, the microcomputer stops normal operation and starts transferring frequency data to the backup RAM (IC6 : µPD5101LC). The microcomputer then detects a drops in the 5V line voltage and sets the RAM in the standby (or bakcup) state. Current consumption during backup is approximately 0.1µA (typ.), and the

CIRCUIT DESCRIPTION

built-in lithium battery can backup the RAM for about 5 years. Various keyboard functions have a telltale audio "Beep" heard through the speaker. The control pulse is fed to the IF unit to trigger multivibrator Q30 & Q31, whose output is fed directly to the AF Power amplifire IC5.

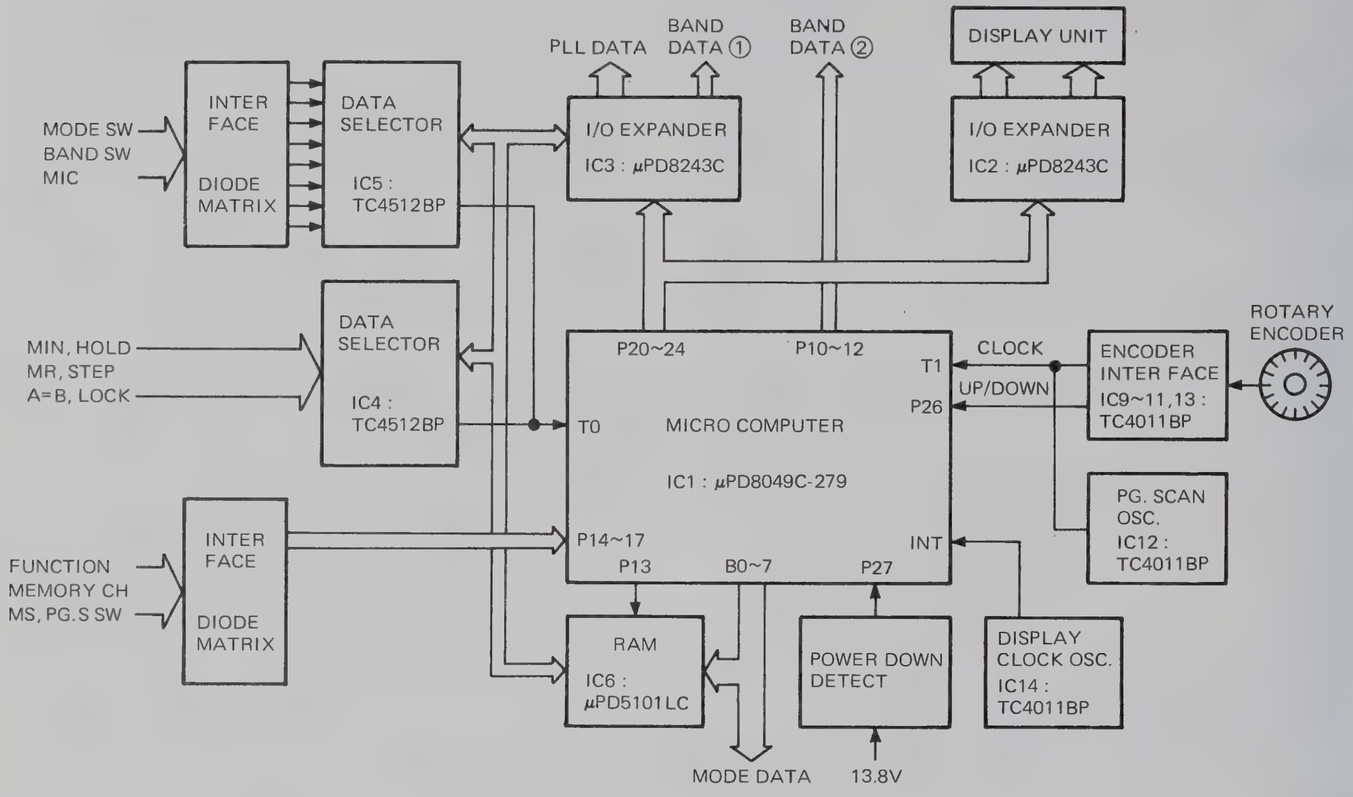


Fig. 4 Digital control system

Terminal No.	Name	Function	Terminal No.	Name	Function
1	T0	Encoder clock, P. SCAN clock input	21	P20	I/O EXPANDER control output
2	XTAL 1	Micro computer clock (5.74MHz) input	22	P21	
3	XTAL 2		23	P22	
4	$\overline{\text{RESET}}$	Microcomputer reset input operate : "H"	24	P23	
5	$\overline{\text{SS}}$	Normally "H" (5V)	25	PROG	
6	$\overline{\text{INT}}$	Display tube dynamic drive clock input (1 kHz)	26	VDD	Power supply 5V
7	EA	Normally "L" (GND)	27	P10	TX inhibit signal (Out of hum band)
8	$\overline{\text{RD}}$	Not used, normally open	28	P11	TX inhibit signal (Out of hum and WARC band)
9	$\overline{\text{PSEN}}$		29	P12	28MHz Power down output
10	WR		30	P13	External RAM control output (R/W)
11	ALE		31	P14	P. SCAN input } M.CH selector input
12	DB0	VFO A indicator output } "L" : Normal "H" : When operating	32	P15	M. SCAN input
13	DB1	VFO B indicator output	33	P16	FUNCTION input
14	DB2	No memory signal output	34	P17	FUNCTION input M.CH input
15	DB3	MODE output LSB	35	P24	I/O Exp. data selector control output "L" : EX (0), DS (1) "H" : EX (1), DS (2)
16	DB4	MODE output USB	36	P25	External RAM control output (CE)
17	DB5	MODE output CW	37	P26	Encoder UP/DOWN input "L" : DOWN, "H" : UP
18	DB6	MODE output AM	38	P27	Voltage down detection signal input "L" : Power down "H" : Normal
19	DB7	MODE output FM	39	T1	Data selector input
20	GND	GND	40	Vcc	Power supply 5V

Table 8 Function of μPD8049C-279

CIRCUIT DESCRIPTION/SEMICONDUCTOR DATA

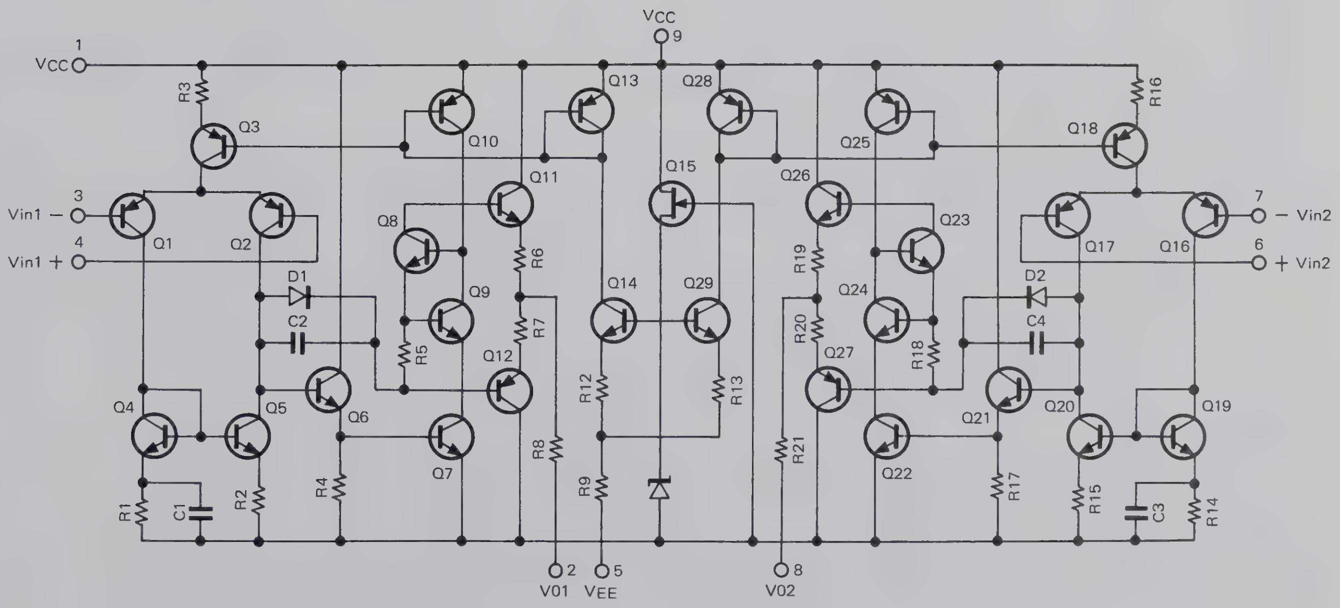
Terminal No.	Name	Function
24	Vcc	Power supply 5V
2	P40	BAND data (BCD output)
3	P41	
4	P42	
5	P43	
6	$\overline{CS}$	Chip selector input
7	PROG	Control input
8	P23	
9	P22	
10	P21	
11	P20	
12	GND	GND
13	P70	PLL 1 data output PLL 2 3 data output
14	P71	PLL 1 clock output
15	P72	
16	P73	
17	P63	PLL select signal Normally : "H"
18	P62	PLL 1 ENABLE
19	P61	PLL 2 clock output
20	P60	PLL 3 clock output
21	P53	External RAM data in-output
22	P52	Data selector output
23	P51	
1	P50	

BAND data	Frequency
Band 0	0–0.5MHz
1	0.5–1.6MHz
2	1.6–2.5MHz
3	2.5–4MHz
4	4–6.5MHz
5	6.5–7.5MHz
6	7.5–10.5MHz
7	10.5–16MHz
8	16–23MHz
9	23–30MHz

Table 9 I/O EXPANDER (0) IC2: μPD8243C

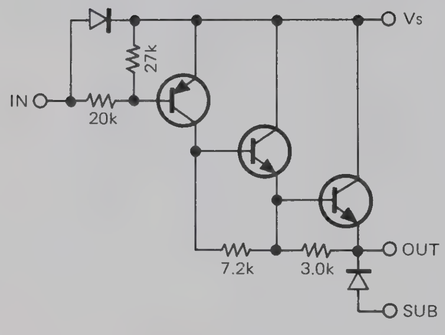
Terminal No.	Name	Function
24	Vcc	Power supply 5V
2	P40	DIGIT output 100Hz
3	P41	DIGIT output 1kHz
4	P42	DIGIT output 10kHz
5	P43	DIGIT output 100kHz
6	$\overline{CS}$	Chip selector input
7	PROG	Control input
8	P23	
9	P22	
10	P21	
11	P20	
12	GND	GND
13	P70	SEGMENT output e
14	P71	SEGMENT output f
15	P72	SEGMENT output g
16	P73	Buzzer output ON : "L"
17	P63	SEGMENT output d
18	P62	SEGMENT output c
19	P61	SEGMENT output b
20	P60	SEGMENT output a
21	P53	DIGIT output M.CH
22	P52	DIGIT output 10Hz
23	P51	DIGIT output 10MHz
1	P50	DIGIT output 1MHz

Table 10 I/O EXPANDER (1) IC3: μPD8243C

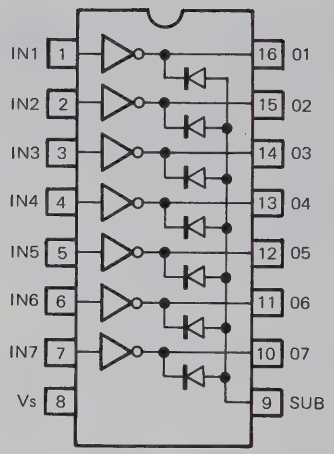


AN6551 Equivalent circuit (IF unit IC1,2)

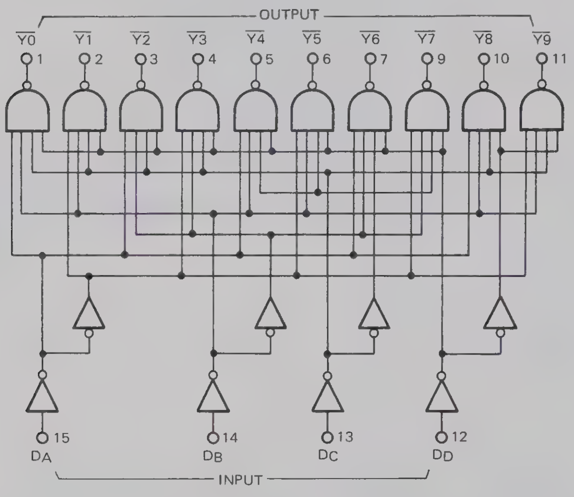
SEMICONDUCTOR DATA



M54561P Equivalent circuit (RF unit IC1)

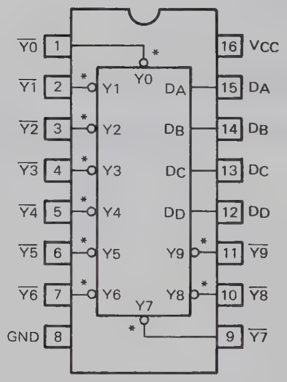


M54561P



M74LS145P Logic circuit (RF unit IC2)

* Open collector output

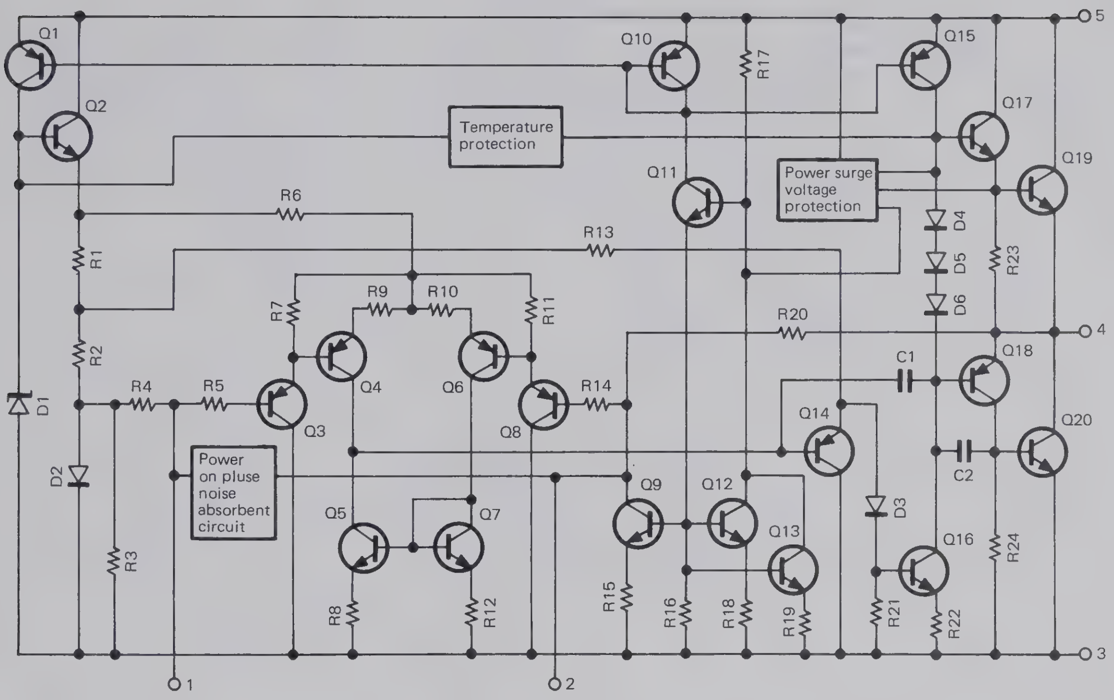


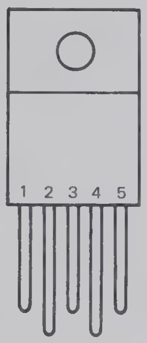
M74LS145P

	INPUT				OUTPUT									
Decade digit	DD	DC	DB	DA	$\overline{Y0}$	$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	$\overline{Y4}$	$\overline{Y5}$	$\overline{Y6}$	$\overline{Y7}$	$\overline{Y8}$	$\overline{Y9}$
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
10	H	L	H	L	H	H	H	H	H	H	H	H	H	H
11	H	L	H	H	H	H	H	H	H	H	H	H	H	H
12	H	H	L	L	H	H	H	H	H	H	H	H	H	H
13	H	H	L	H	H	H	H	H	H	H	H	H	H	H
14	H	H	H	L	H	H	H	H	H	H	H	H	H	H
15	H	H	H	H	H	H	H	H	H	H	H	H	H	H

M74LS145P Truth table

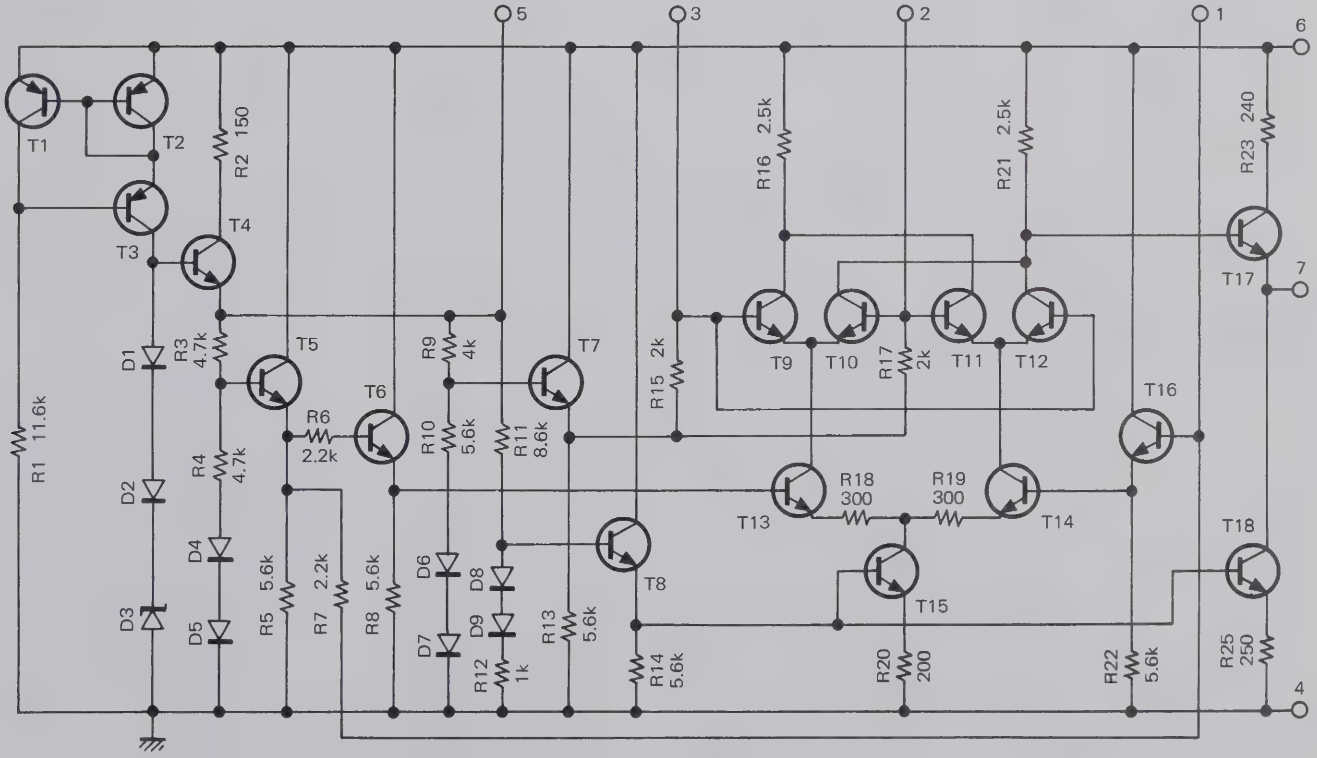
SEMICONDUCTOR DATA





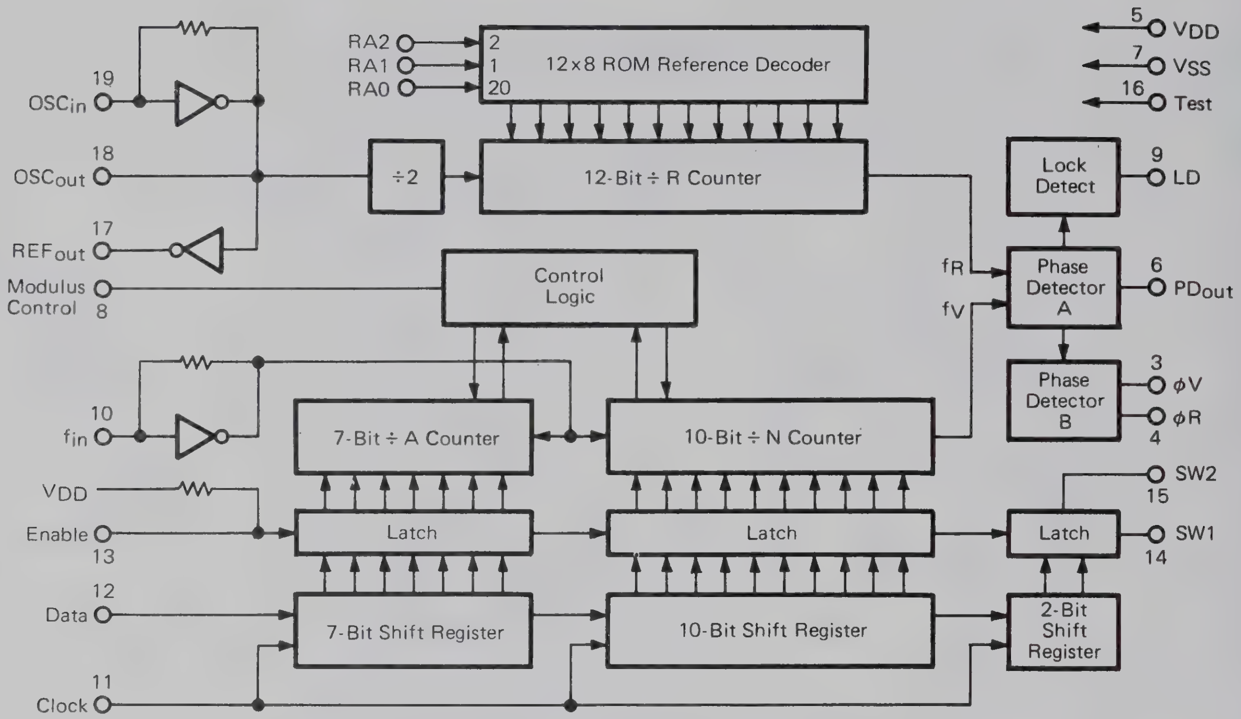
1 : Input
2 : NFB
3 : GND
4 : Output
5 : Power supply + Vcc

μPC2002V Equivalent circuit (IF unit IC5)

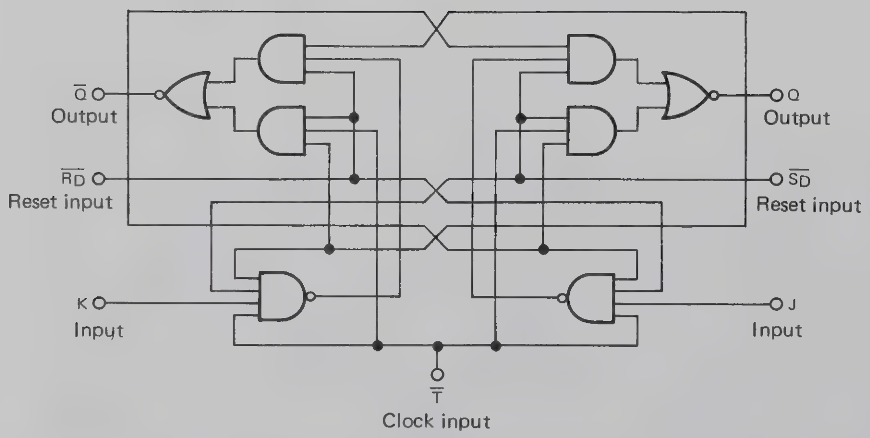


AN612 Equivalent circuit (IF unit IC7)

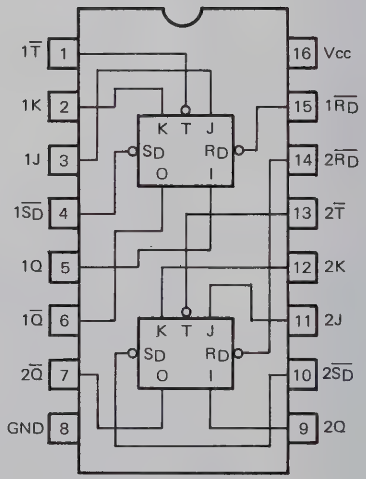
SEMICONDUCTOR DATA



MC14156P Block diagram (PLL unit IC1)

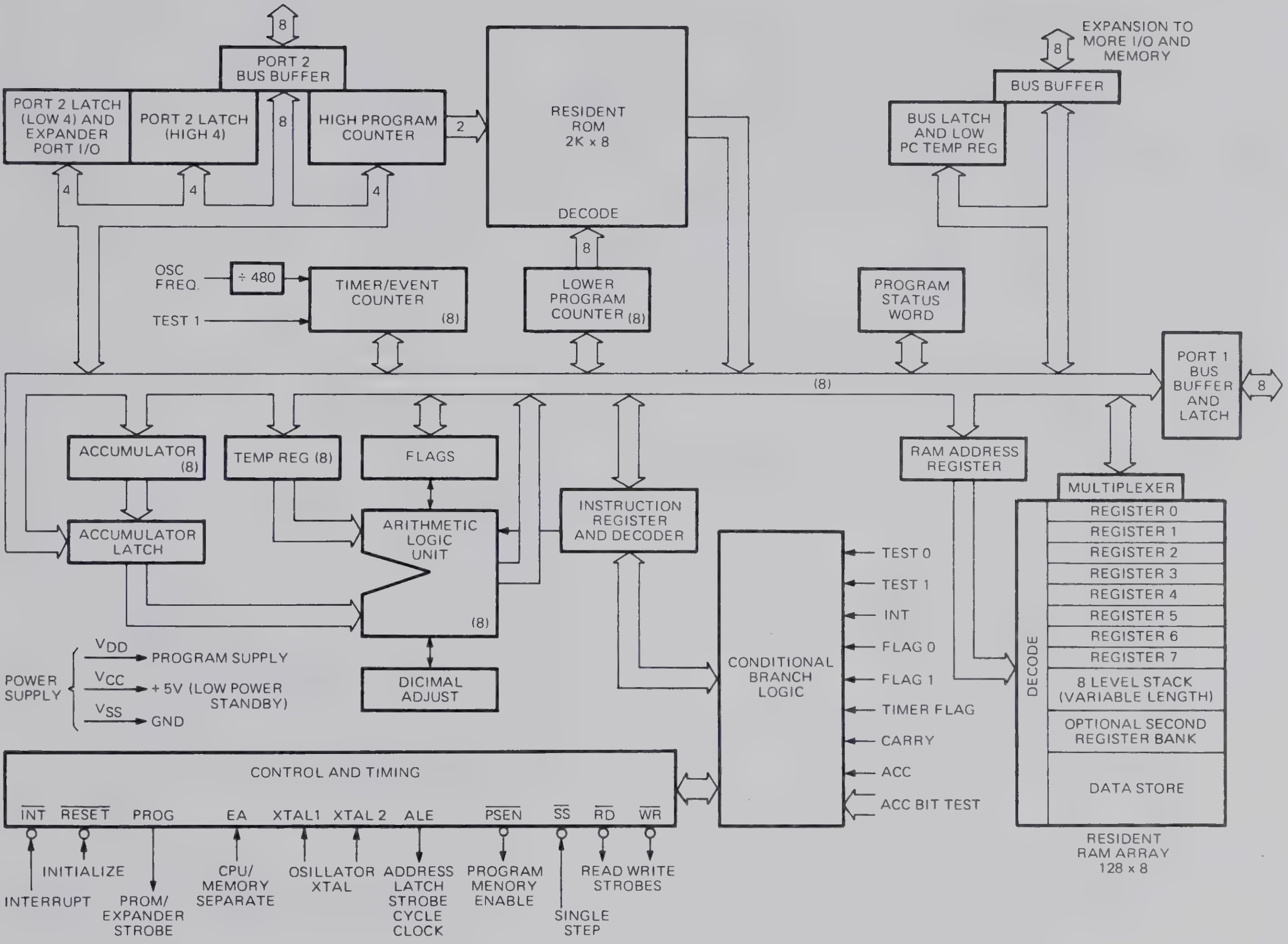

$\overline{Q}$ Output
Q Output
$\overline{RD}$ Reset input
$\overline{SD}$ Reset input
K Input
J Input
$\overline{T}$ Clock input

M74LS112AP Logic circuit (PLL unit IC5)

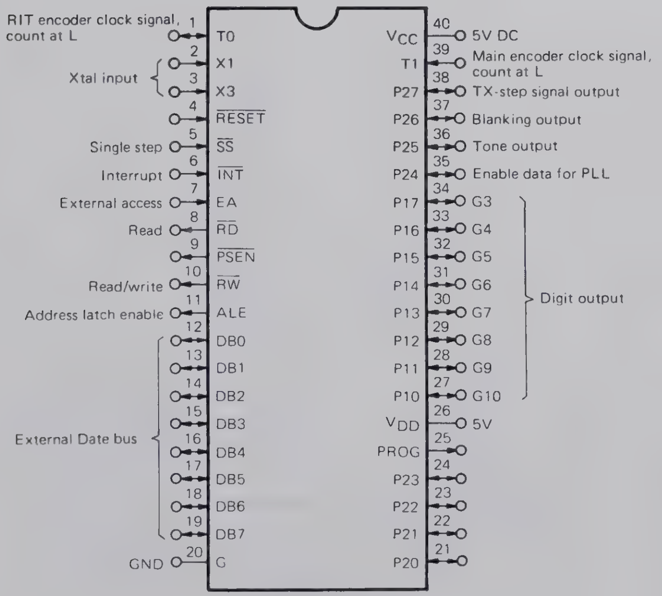


M74LS112AP

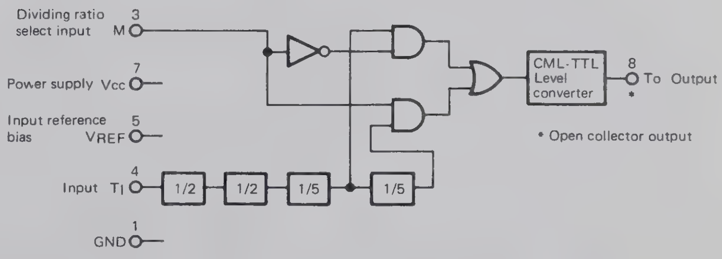
SEMICONDUCTOR DATA



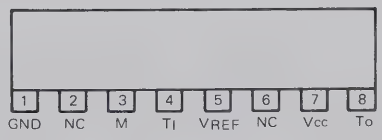
µPD8049C-279 Block diagram (Control unit IC1)



µPD8049C-279

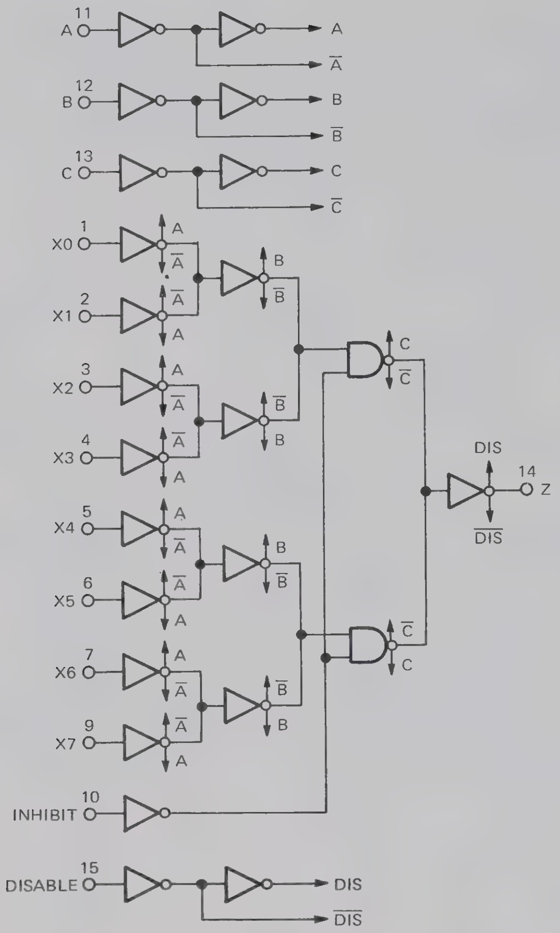


M54459L Block diagram (Control unit IC18)

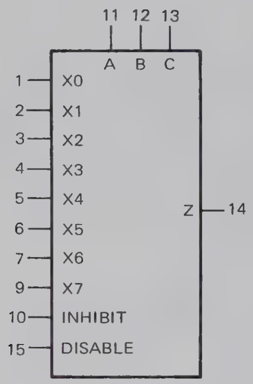


M54459L

SEMICONDUCTOR DATA



TC4512BP Block diagram (Control unit IC4,5)



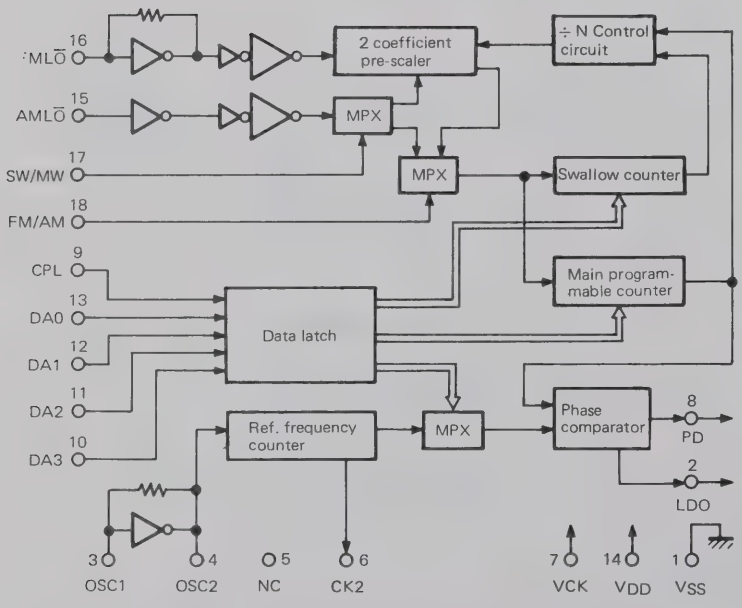
8 : V_{SS}
16 : V_{DD}

TC4512BP

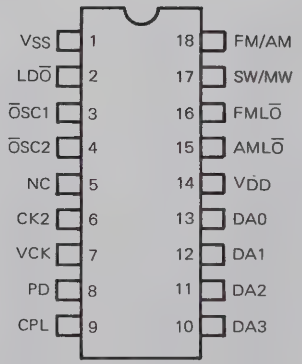
A	B	C	INHIBIT	DISABLE	Z
L	L	L	L	L	X0
H	L	L	L	L	X1
L	H	L	L	L	X2
H	H	L	L	L	X3
L	L	H	L	L	X4
H	L	H	L	L	X5
L	H	H	L	L	X6
H	H	L	L	L	X7
*	*	*	H	L	L
*	*	*	*	H	HZ

* : Don't Care
HZ : High Impedance

TC4512BP Truth table



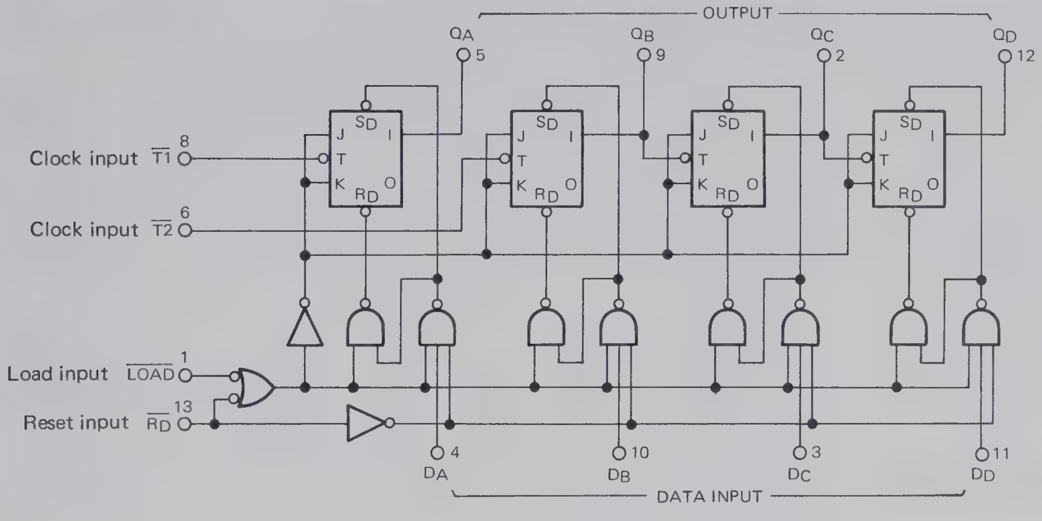
MN6147C Block diagram (Control unit IC7,8)



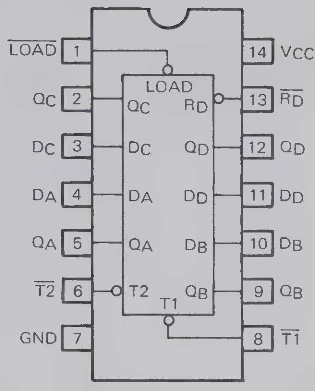
V_{SS}	: Ground	CPL	: Latch clock
LD$\overline{O}$	: OSC circuit output	DA3–DA0	: Data address
$\overline{O}$SC1	: Ext. clock input	V_{DD}	: Main power supply
NC	: No connection	AML$\overline{O}$	: AM local OSC input
CK2	: Clock output (1kHz)	FML$\overline{O}$	: FM local OSC input
VCK	: Clock circuit back up	SW/MW	: SW,MW select
PD	: Phase detector output	FM/AM	: FM,AM select

Clock output (1kHz)

SEMICONDUCTOR DATA



M74LS197P Logic circuit (Control unit IC16)



M74LS197P

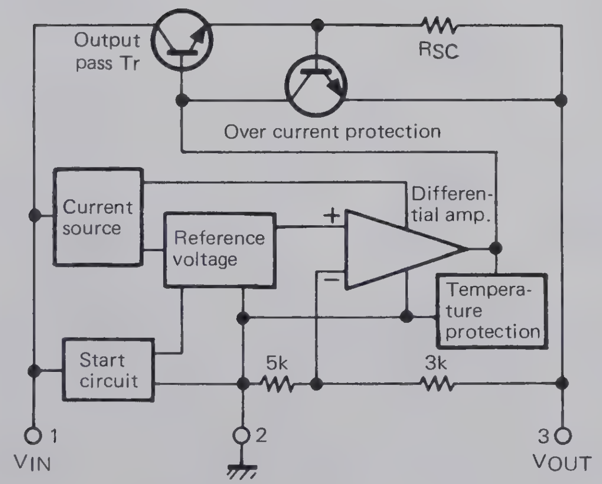
INPUT			OUTPUT			
$\overline{T}$	$\overline{RD}$	$\overline{LOAD}$	QA	QB	QC	QD
X	L	X	L	L	L	L
X	H	L	DA	DB	DC	DD
↓	H	H	COUNT			

↓ : Change H to L
× : Either H or L

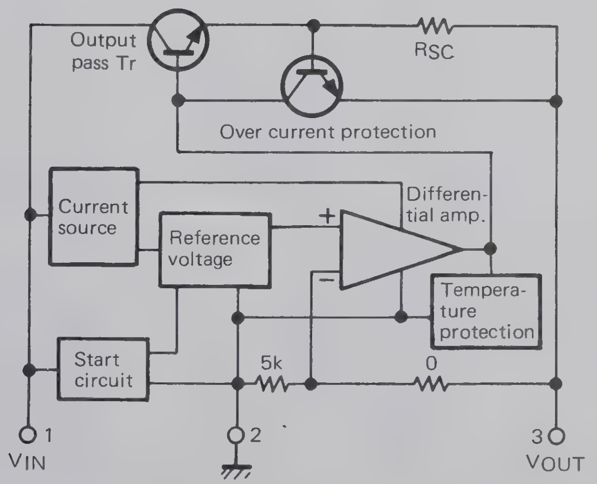
M74LS197P Truth table (1)

	OUTPUT			
COUNT	QA	QB	QC	QD
0	L	L	L	L
1	H	L	L	L
2	L	H	L	L
3	H	H	L	L
4	L	L	H	L
5	H	L	H	L
6	L	H	H	L
7	H	H	H	L
8	L	L	L	H
9	H	L	L	H
10	L	H	L	H
11	H	H	L	H
12	L	L	H	H
13	H	L	H	H
14	L	H	H	H
15	H	H	H	H

M74LS197P Truth table (2)



AN7808 Block diagram (IF unit IC8)



AN7805 Block diagram (IF unit IC9)

PARTS LIST

CAPACITORS

CC 45 TH 1H 220 J
1 2 3 4 5 6

1 = Type ..... ceramic, electrolytic, etc
2 = Shape ..... round, square, etc
3 = Temp coefficient
4 = Voltage rating
5 = Value
6 = Tolerance

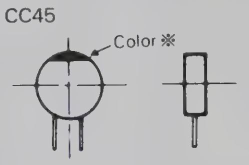
● Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color ※	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	−80	−150	−220	−330	−470	−750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example CC45TH = −470±60 ppm/°C

CC45



● Tolerance

Cord	C	D	G	J	K	M	X	Z	P	No cord
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 −20	+80 −20	+100 −0	More than 10μF −10～+50 Less than 4.7μF −10～+75

Less than 10 pF

Cord	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

● Rating voltage

2nd word \ 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	—
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	—
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	—

● Capacitor value

0 1 0 = 1pF
1 0 0 = 10pF
1 0 1 = 100pF
1 0 2 = 1000pF = 0.001μF
1 0 3 = 0.01μF
2 2 0 = 22pF
1st number
2nd number
Multiplier

Symbol	Destination
K	U.S.A.
W	Europe
T	Britain
M	General market

Abbreviation		Abbreviation	
Cap	Capacitor	ML	Mylar
C	Ceramic	S	Styren
E	Electrolytic	T	Tantalum
MC	Mica		

Resistors not listed in this parts list are standard, fixed carbon composition, 1/4W or 1/8W.
The resistance values, in ohms, are indicated on the schematic diagram.

SEMICONDUCTOR

N : New parts

Item	Re-marks	Name
Diode		1N60
		1S1007
		1S1555
		1S1587
		1S2588
		BA379
		ITT310
	N	LN66(R)
		S31C
		V06B
Vari-cap		1SV53A
		1SV54GC
Varistor		MV5T
		MV13
		SV03Y
Zener diode		BZ-240
		RD3.0EB2
		RD4.3EB3
		RD5.1EB1
		RD6.2EB1
		RD6.2EB2
		RD9.1EB2
		RD9.1EB3
		RD10EB1
LED	N	LN247RP
	N	LN347GP
	N	LN447YP
		SG238D
		SY438D
Surge absober		ERZC07DK201
		ERZD03DK331
Thermistor		25D29
		32D27
	N	SDT1000F
Display tube	N	FIP9D7
Photo TR	N	PN126S
TR		2SA562(Y)
		2SA733(R)
		2SA1015(Y)
		2SC460(B)
		2SC945(Q)
		2SC945(R)
		2SC1775(E)
		2SC1815(GR)
		2SC1815(Y)
		2SC1923(O)
		2SC1959(Y)
		2SC2053
		2SC2075
		2SC2240(GR)
		2SC2290*J
		2SC2509
		2SC2538
		2SC2603(E)
		2SC2703(O)
	N	2SC2703(O or Y)
		2SD880(Y)
FET		2SK30A(O)
		2SK125
		2SK192A(GR)
		2SK192(Y)
		3SK73(GR)
		3SK74(L)
IC		74LS90N
	N	AN612
	N	AN6551
	N	AN7805
	N	AN7808
		HD74LS90P
		LM358P
	N	M74LS112AP
	N	M74LS145P
		M74LS196P
	N	M74LS197P
	N	M54459L
	N	M54561P
		MB3614
		MC145156P
	N	MN6147C
		SN74LS90N
		SN74S10N
		SN74S112N
		SN16913P
		TC4011BP
		TC4512BP
		TC5065BP
		TC5067BP
		μPB551C
	N	μPC1158H2
	N	μPC2002V
		μPD5101LC
	N	μPD8049C-279
		μPD8243C

PARTS LIST

Part No.	Remarks	Description	Ref. No.
		TS-430 GENERAL	
A01-0935-02	N	Case (A) upper	
A01-0936-02	N	Case (B) lower	
A20-2457-13	N	Panel	
B05-0708-04		SP grill cloth	
B30-0817-15		Pilot lamp 14V, 80mA	
B31-0639-05	N	Meter	
B39-0407-04		Spacer x 2 Assistant foot	
B42-1767-04	N	VOX name plate Case (A)	
B42-1768-04	N	Switch plate	
B43-0683-14	N	Name plate **K,M,W**	
B43-0684-04	N	Name plate **T**	
B46-0410-10		Warranty card **K**	
B50-4006-10	N	Instruction manual **K,M**	
B50-4007-00	N	Instruction manual **T**	
B50-4130-00	N	Instruction manual **W**	
CE04W1A470M		E 47 10V Encoder ass'y	C1
CK45E2H222P		C 0.0022 500V	C3
CK45F1H103Z		C 0.01	C2,4--8
CK45F1H473Z		C 0.047	C1
D09-0306-04	N	Slit plate Moving	
D09-0307-04	N	Slit plate Fixed	
D40-0626-15	N	Detector mech. ass'y	
E04-0152-05		UHF type receptacle ANT	
E06-0751-05		7P DIN socket REMOTE	
E06-0851-05		8P DIN socket X.VERTOR, W SW	
E06-0852-05		8P DIN socket ACC,W/O SW	
E07-0751-05		7P DIN plug Accessory	
E07-0851-05		8P DIN plug Accessory	
E08-0671-05		6P square socket	
E11-0403-05		Phone jack EXT.SP	
E11-0404-05		3P phone jack KEY	
E11-0412-05		3P phone jack PHONE	
E12-0001-15		Phone plug Accessory	
E20-0315-05		Mold terminal 3P	
E23-0417-05		Pressure weld terminal x 2	
E29-0407-05		Bridge connector	
E30-1637-05		4 cores cable	
E30-1638-05		DC cord Accessory	
E31-0431-15		Speaker cord	
E31-2154-05	N	CAL cord Accessory	
F05-2034-05		Fuse 20A	
F15-0641-04	N	Switch mask Case (A)	
G02-0505-05		Knob fixed spring x 4	
G13-0665-04	N	Cushion MODE	
G13-0666-04	N	Cushion x 2 Panel	
G13-0668-04		Cushion VOX	
G53-0515-04		Packing (B) x 2	
H01-4543-04	N	Packing carton (inside)	
H03-2083-04	N	Packing carton (outside)	
H10-2565-02	N	Packing fixture (F)	
H10-2566-02	N	Packing fixture (R)	
H12-1315-04	N	Cushion	
H20-1410-03		Protective cover	

Part No.	Remarks	Description	Ref. No.
H25-0079-04		Protective bag MIC **M**	
H25-0112-04		Protective bag Cord	
H25-0116-04		Protective bag	
J02-0323-05		Foot x 4	
J02-0403-04		Rubber foot x 4	
J02-0407-04		Assistant foot	
J13-0404-05		Fuse holder	
J21-2573-04		Foot mounting hardware x 2	
J31-0141-04		Spacer ring MIC	
J61-0019-05		Vinyle tie x 10	
J61-0408-05		Nylon band x 27	
K01-0410-05	N	Carring handle	
K21-0768-04	N	Main knob	
K23-0710-04		Knob (inside) x 4 AF,MIC,NOTCH,RIT	
K23-0753-04		Pointer knob x 2 FUNCTION,M.CH	
K27-0426-14		BAND knob x 2 BAND	
K29-0741-24		Knob (outside) x 4 RF,CAR,SQL, IF SHIFT	
K29-0758-04		Push knob POWER	
K29-0767-04	N	Push knob x 4 1MHz STEP, NB, ATT,NOTCH	
K29-0768-04	N	Push knob RIT	
K29-0769-04	N	Push knob MODE(LSB,USB, CW,AM,FM)	
K29-0770-04	N	Push knob A=B,LOCK,STEP, M.CH,MR,M.IN,MS,PG.S,HOLD	
K29-0771-04	N	Knob ring Main knob	
N09-0256-05		GND screw x 4 Sub, rear panel	
N09-0646-04	N	Round screw x 2	
N10-2030-46		Nut x 2 Mold terminal	
N14-0115-05		Flange nut GND	
N14-0509-05		Wing nut GND	
N15-1040-46		Flat washer x 2 GND	
N16-0030-46		Spring washer	
N30-2004-46		Round screw x 5	
N30-2604-46		Round screw x 17	
N30-3008-46		Round screw x 2 Mold terminal	
N30-4016-46		Round screw GND	
N32-2604-46		Flat screw x 9	
N32-2606-46		Flat screw x 8	
N32-3006-46		Flat screw x 5	
N33-3006-41		Round flat screw x 4 SP	
N33-3006-45		Round flat screw x 4 Panel	
N35-3006-41		Bind screw x 16 Case (A),(B)	
N35-3006-46		Bind screw x 16 Panel	
N87-2606-46		Self tapping screw x 2 VFO A,B	
N87-3006-41		Self tapping screw x 6	
N87-3006-46		Self tapping screw x 8	
N87-3012-46		Self tapping screw x 33	
N88-3006-46		Flat tepping screw x 16	
N89-3006-45		Bind tapping screw x 4 Final	
R12-2411-06		Trim. pot. 5kΩ(B) x 2 Encoder ass'y	VR1,2
RS14AB3A100J		MF 10Ω 1W	R5
RS14AB3D472J		MF 4.7kΩ 2W	R6
R92-0662-05	N	Cement 10mΩ 5W	R1
S40-2437-05		Push switch POWER	S1

PARTS LIST

Part No.	Re-marks	Description	Ref. No.
T03-0027-15		Speaker	
T91-0352-05		Microphone Accessory **M**	
W02-0328-10	N	Encoder ass'y	
W09-0326-05		Lithium battery CR2032	
X41-1470-00	N	Switch unit	
X44-1510-11	N	RF unit	
X45-1280-00	N	Final unit	
X48-1370-00	N	IF unit	
X50-1910-00	N	PLL unit	
X51-1290-00	N	Filter unit	
X53-1290-00	N	Control unit	
X54-1710-00	N	Display unit	

SWITCH UNIT (X41-1470-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1C222M		E 2200 16V	C2,3	2
CK45B1H102K		C 0.001	C10,11	2
CK45F1H103Z		C 0.01	C5,6	2
CK45F1H473Z		C 0.047	C1,4	2
C91-0456-05		C 0.047	C7,8,12	3
E06-0853-05		8P metal socket MIC		1
E08-0272-05	N	Mini connector 2P		1
E08-0373-05	N	Mini connector 3P		1
E23-0401-05		Round terminal		1
E40-0273-05		Mini connector 2P		5
E40-0473-05		Mini connector 4P		1
E40-0573-05		Mini connector 5P		1
E40-0673-05		Mini connector 6P		4
L15-0016-05		Choke coil	CH1	1
N10-2030-46		Nut		2
N30-3008-46		Round screw 3 x 8		2
R12-4410-05		Trim. pot. 50kΩ	VR1	1
R13-1401-05	N	Pot. 1kΩ(B) ANTI VOX	VR8	1
R13-4401-05	N	Pot. 50kΩ(B) VOX GAIN	VR6	1
R13-6401-05	N	Pot. 250kΩ(B) DELAY, SCAN	VR7,9	2
R19-3415-05	N	Pot. 10kΩ(A) x 2 MIC/ CAR	VR4	1
R19-3416-05	N	Pot. 10kΩ(B), 10kΩ(F) AF/RF	VR2	1
R19-3417-05	N	Pot. 10kΩ(B),10kΩ(F) RIT/SHIFT	VR3	1
R24-9403-15	N	Pot. 250kΩ/10kΩ(B) 50kΩ(B) NOTCH/SQL	VR5	1
S29-1427-05	N	Rotary switch FUNCTION	S2	1
S29-1428-05	N	Rotary switch M.CH	S1	1
S36-2408-05	N	Paddle switch SEND/ REC, VOX/MAN	S14,15	2
S36-2411-05	N	Paddle switch PROC, ALC/IC, MAR/WIDE	S16–18	3
S40-2440-15	N	Push switch LOCK, STEP, M.CH,MS, PG.S, HOLD, 1MHz STEP, RIT NB, ATT, NOTCH	S6–8,11–13, 19–23	11
S40-2441-15	N	Push switch A=B, MR, M.IN	S5,9,10	3
S50-1409-05		Tact switch BAND	S3,4	2
S50-1411-05		Tact switch MODE	S24–28	5

RF UNIT (X44-1510-11)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CC45RH1H010C		C 1P	C141	1
CC45RH1H030C		C 3P	C144,200	2
CC45RH1H050C		C 5P	C93,145	2
CC45RH1H070D		C 7P	C138,140	2
CC45RH1H100D		C 10P	C80,90,134,143	4
CC45RH1H101J		C 100P	C73	1
CC45RH1H270J		C 27P	C101	1
CC45RH1H330J		C 33P	C158	1
CC45RH1H560J		C 56P	C77,78	2
CC45SL1H030C		C 3P	C122	1
CC45SL1H050C		C 5P	C152,159	2
CC45SL1H070D		C 7P	C154	1
CC45SL1H101J		C 100P	C70,71,104,110	4
CC45SL1H121J		C 120P	C58,166,186	3
CC45SL1H151J		C 150P	C59	1
CC45SL1H180J		C 18P	C199	1
CC45SL1H181J		C 180P	C53	1
CC45SL1H221J		C 220P	C46	1
CC45SL1H271J		C 270P	C48,54	2
CC45SL1H330J		C 33P	C72,79	2
CC45SL1H390J		C 39P	C3	1
CC45SL1H470J		C 47P	C2,106,107, 157	4
CC45SL1H560J		C 56P	C63,189	2
CC45SL1H680J		C 68P	C1,64	2
CC45SL1H820J		C 82P	C190	1
CE04W1A101M		E 100 10V	C180	1
CE04W1A220M		E 22 10V	C84	1
CE04W1A470M		E 47 10V	C178,179	2
CE04W1C100M		E 10 16V	C108	1
CE04W1H010M		E 1 50V	C15,23,29,34,37, 45,50,55,60,66, 129,165,177,191	14
CE04W1H3R3M		E 3.3 50V	C173,182	2
CE04W1H4R7M		E 4.7 50V	C174	1
CE04W1HR47M		E 0.47 50V	C108,170	2
CK45B1H102K		C 0.001	C85,92,98–100, 114,116,124,155	9
CK45B1H122K		C 0.0012	C8,26	2
CK45B1H152K		C 0.0015	C18,20,25	3
CK45B1H222K		C 0.0022	C24	1
CK45B1H391K		C 390P	C40,41	2
CK45B1H471K		C 470P	C36,42,47,49	4
CK45B1H561K		C 560P	C125	1
CK45B1H681K		C 680P	C30,31,35	3

PARTS LIST

Part No.	Re-marks	Description	Ref. No.	Q'ty
CK45F1H103Z		C 0.01	C5,61,65,81–83, 87,91,96,97,103, 105,109,111,113, 115,117,120,127, 128,133,135,147, 153,160–162,169, 175,183,184,187, 188,192,202	35
CK45F1H223Z		C 0.022	C14,22,28,32,38, 43,51,56,88,89, 95,112,118,119, 121,123,126,132, 136,137,139,156, 163,164,168,195 196	27
CQ92M1H103K		ML 0.01	C176	1
CQ92M1H223K		ML 0.022	C181	1
CQ92M1H472K		ML 0.0047	C171	1
CQ92M1H473K		ML 0.047	C172	1
C90-0838-05		E 1 50V	C193	1
C91-0105-05		C 0.0047	C7,10,13,74,75	5
C91-0125-05		C 0.0027	C6,19	2
C91-0131-05		C 0.01	C146,148–150	4
C91-0132-05		C 0.01	C11,12,16,17	4
C91-0456-05		C 0.047	C4,9,21,27,33, 39,44,52,57,62, 67–69,86,102, 130,131,151,185, 194,197,201	22
C91-0498-05		C 0.35P	C142	1
E04-0157-05		Mini pin jack A		3
E23-0512-05		Terminal		1
E40-0273-05		Mini connector 2P		8
E40-0373-05		Mini connector 3P		2
E40-0473-05		Mini connector 4P		1
E40-0573-05		Mini connector 5P		3
E40-0673-05		Mini connector 6P		2
E40-0773-05		Mini connector 7P		1
J31-0502-04		PC board collar		6
J42-0428-05		PC board bushing		6
L19-0324-05		Wide bandwidth transf.	T3,23	2
L19-0328-05		Wide bandwidth transf.	T24	1
L19-0344-05		Wide bandwidth transf.	T2	1
L30-0506-05		Tuning coil	T11	1
L30-0511-05		Tuning coil 8.83MHz	T14	1
L34-0535-05		Tuning coil	T15	1
L34-0536-05		Tuning coil	T16	1
L34-0697-05		Tuning coil	T18	1
L34-0857-05		Tuning coil	T7	1
L34-0858-05		Tuning coil	T22	1
L34-0859-05		Tuning coil	T5,21	2
L34-0860-15		Tuning coil	T20	1
L34-0862-05		Tuning coil	T17	1
L34-0942-05		Tuning coil	T13	1
L34-2159-05		Tuning coil	T12	1
L34-2142-05	N	Tuning coil	T4,10	2
L34-2143-05	N	Tuning coil	T1	1
L34-2144-05	N	Tuning coil	T8	1
L34-2145-05	N	Tuning coil	T6	1

Part No.	Re-marks	Description	Ref. No.	Q'ty
L34-2146-05	N	Tuning coil	T19	1
L40-1001-02		Ferri-inductor 10μH	L6–8	3
L40-1001-14		Ferri-inductor 10μH	L15,17,41,65,66	5
L40-1011-03		Ferri-inductor 100μH	L48,53	2
L40-1011-14		Ferri-inductor 100μH	L67	1
L40-1021-03		Ferri-inductor 1mH	L3,44	2
L40-1092-14		Ferri-inductor 1μH	L28	1
L40-1292-14		Ferri-inductor 1.2μH	L31,33	2
L40-1501-03		Ferri-inductor 15μH	L47	1
L40-1511-03		Ferri-inductor 150μH	L68	1
L40-1511-13		Ferri-inductor 150μH	L63	1
L40-1511-14		Ferri-inductor 150μH	L5,50,51,55,64	5
L40-1592-14		Ferri-inductor 1.5μH	L25	1
L40-1892-01		Ferri-inductor 1.8μH	L54	1
L40-1892-14		Ferri-inductor 1.8μH	L27,29	2
L40-2201-14		Ferri-inductor 22μH	L11	1
L40-2211-14		Ferri-inductor 220μH	L4,45	2
L40-2282-01		Ferri-inductor 0.22μH	L2	1
L40-2282-14		Ferri-inductor 0.22μH	L42	1
L40-2292-14		Ferri-inductor 2.2μH	L19,24,26	3
L40-2701-14		Ferri-inductor 27μH	L10,12	2
L40-3301-14		Ferri-inductor 33μH	L62	1
L40-3382-01		Ferri-inductor 0.33μH	L1,46,56	3
L40-3382-14		Ferri-inductor 0.33μH	L38	1
L40-3391-14		Ferri-inductor 3.3μH	L18,60	2
L40-3982-14		Ferri-inductor 0.39μH	L35,36,39,40,43	5
L40-3991-14		Ferri-inductor 3.9μH	L21,22	2
L40-4701-03		Ferri-inductor 47μH	L49,52,57	3
L40-4701-13		Ferri-inductor 47μH	L59	1
L40-4701-14		Ferri-inductor 47μH	L13,14,61	3
L40-4791-14		Ferri-inductor 4.7μH	L23	1
L40-5682-14		Ferri-inductor 0.56μH	L37	1
L40-5691-14		Ferri-inductor 5.6μH	L20	1
L40-6811-03		Ferri-inductor 680μH	L9	1
L40-6822-14		Ferri-inductor 0.68μH	L30,32	2
L40-8282-14		Ferri-inductor 0.82μH	L34	1
L40-8291-14		Ferri-inductor 8.2μH	L16	1
L71-0214-05		MCF 48.055MHz	XF	1
L92-0110-05		Ferrite-bead	L70,71	2
R12-1412-05		Trim. pot. 1kΩ	VR1–4	4
R12-3428-05		Trim. pot. 47kΩ	VR5	1
R90-0517-05		Resistor block 4.7kΩ x 7	RB1	1
S51-1404-05		Relay G2E	RL1	1

100W FINAL UNIT (X45-1280-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CC45CH1H220J		C 22P	C5	1
CC45SL2H220J		C 22P 500V	C29	1
CC45SL2H101J		C 100P 500V	C10	1
CC45SL2H271J		C 270P 500V	C34,35	2
CE04W1C100M		E 10 16V	C17,22	2
CE04W1E101M		E 100 25V	C19,23	2
CK45B1H102K		C 0.001	C21	1
CK45B1H103K		C 0.01	C13,14,26,27	4

PARTS LIST

Part No.	Re-marks	Description	Ref. No.	Q'ty
CK45B1H471K		C 470P	C1	1
CK45F1H103Z		C 0.01	C33	1
CK45F1H473Z		C 0.047	C6,7,28	3
CM73F2H122J		Laminated cap. 0.0012 500V	C15	1
CM93D2H561J		MC 560P 500V	C30	1
C91-0456-05		C 0.047	C2–4,8,9,16, 18,20,24,25,31,32	12
C91-1004-05	N	Chip cap. 0.0068 50V	C11,12	2
E23-0401-05		Round terminal		1
E40-0273-05		Mini connector 2P		1
E40-0275-05		Pin connector 2P		1
E40-0373-05		Mini connector 3P		1
F01-0785-05	N	Heat sink		1
F07-0846-03	N	Heat sink cover		1
F09-0405-14		Fan		1
F20-0078-05		Insulating sheet		3
F29-0014-05		Shoulder washer		7
F29-0406-03		Fan motor ass'y		1
L19-0338-05		Input matching transf.	T1	1
L19-0342-05	N	Drive transf.	T2	1
L19-0343-05	N	Final transf.	T3	1
L33-0617-05		Choke coil	L11	1
L33-0651-05		Choke coil	L5–10	6
L33-0652-05		Choke coil 0.7μH	L1	1
L40-1011-03		Ferri-inductor 100μH	L12	1
L40-1021-03		Ferri-inductor 1mH	L3,4	2
L40-1511-03		Ferri-inductor 150μH	L2	1
N15-1030-46		Washer		4
N30-2604-46		Round screw 2.6 x 4		5
N30-3006-46		Round screw 3 x 6		3
N30-3008-46		Round screw 3 x 8		4
N35-3006-45		Bind screw 3 x 6		4
N87-3006-46		Self tapping screw 3 x 6		8
N89-3006-45		Bind tapping screw 3 x 6		6
R12-1406-05		Trim. pot. 1kΩ (B)	VR1,2	2
RC05GF2H150J		Solid 15Ω 1/2W	R15,16	2
RC05GF2H221J		Solid 220Ω 1/2W	R8,11	2
RC05GF2H3R9J		Solid 3.9Ω 1/2W	R6	1
RS14AB3D150J		MF 15Ω 2W	R23	1
RS14GB3D2R2J		MF 2.2Ω 2W	R12,13	2
RS14GB3F390J		MF 39Ω 3W	R14,17	2
R92-0150-05		Short jumper		9
T42-0301-05		Fan motor		1

IF UNIT (X48-1370-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
C05-0309-05		Ceramic trimmer 40P	TC1	1
CC45SL1H050C		C 5P	C142	1
CC45SL1H100D		C 10P	C30	1
CC45SL1H101J		C 100P	C32,91,94	3
CC45SL1H150J		C 15P	C165,166	2
CC45SL1H221J		C 220P	C64,153	2
CC45UJ1H470J		C 47P	C63,65,125,137, 149	5
CC45UJ1H330J		C 33P	C34	1
CE04BW1HR22M		E 0.22 50V	C55	1
CE04BW1HR47M		E 0.47 50V	C99	1
CE04W0J470M		E 47 6.3V	C121	1
CE04W1A101M		E 100 10V	C47,147	2
CE04W1A221M		E 220 10V	C98	1
CE04W1A470M		E 47 10V	C39,56,116,150, 151,158	6
CE04W1C100M		E 10 16V	C81,101	2
CE04W1C220M		E 22 16V	C112	1
CE04W1H0R1M		E 0.1 50V	C57	1
CE04W1H010M		E 1 50V	C44,50,62,68, 70,72,93,100, 102,103,105,111, 118–120,135,146	17
CE04W1H100M		E 10 50V	C53,97	2
CE04W1HR22M		E 0.22 50V	C58,164	2
CE04W1HR47M		E 0.47 50V	C41,48,54,59, 106	5
CE04W1H4R7M		E 4.7 50V	C40,43,104	3
CK45B1H102K		C 0.001	C14,21,26,33, 130,148	6
CK45B1H471K		C 470P	C127	1
CK45F1H103Z		C 0.01	C2,3,12,25,36, 38,61,69,71,76, 82,123,126,128, 136,138,144,145, 156,157,160	21
CK45F1H223Z		C 0.022	C1,4–11,13, 16–20,23,24, 28,29,31,66,73, 107,139–141	26
CQ92M1H102K		ML 0.001	C52,122	2
CQ02M1H103K		ML 0.01	C108,109	2
CQ92M1H104K		ML 0.1	C77,90	2
CQ92M1H123K		ML 0.012	C86–89	4
CQ92M1H153K		ML 0.015	C96	1
CQ92M1H222K		ML 0.0022	C37	1
CQ92M1H223K		ML 0.022	C110	1
CQ92M1H333K		ML 0.033	C42,46	2
CQ92M1H392K		ML 0.0039	C51	1
CQ92M1H472K		ML 0.0047	C80	1
CQ92M1H473K		ML 0.047	C74,83,85,95	4
CQ92M1H822K		ML 0.0082	C154	1
CS16E1ER47M		T 0.47 25V	C161	1
CS15E1VR22M		T 0.22 35V	C159	1
C90-0838-05		E 1 50V	C49,67	2
C90-0840-05		E 10 10V	C60,84	2
C90-0847-05		E 47 10V	C92,152	2
C90-0848-05		E 47 16V	C115	1
C90-0864-05	N	E 220 10V	C75	1
C90-0866-05		E 470 6.3V	C79	1
C91-0119-05		C 0.047	C15,22,27,45,78, 113,114,117,124	9
C91-1008-05		C 0.022	C162,163	2

PARTS LIST

Part No.	Remarks	Description	Ref. No.	Q'ty
E23-0512-05		Terminal		2
E29-0413-05		1P connector (female)		1
E40-0273-05		Mini connector 2P		13
E40-0373-05		Mini connector 3P		2
E40-0473-05		Mini connector 4P		4
E40-0573-05		Mini connector 5P		3
E40-0673-05		Mini connector 6P		3
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		1
F20-0516-05		Insulating sheel		1
F29-0014-05		Shoulder washer		1
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7
L34-0535-05		Tuning coil	L3,9	2
L34-0536-06		Tuning coil	L4	1
L34-0708-05		Tuning coil	L1	1
L34-2077-05		Tuning coil	L2	1
L40-1011-14		Ferri-inductor 100μH	L14,15	2
L40-1021-03		Ferri-inductor 1mH	L5	1
L40-1511-03		Ferri-inductor 150μH	L10,11	2
L40-3391-03		Ferri-inductor 3.3μH	L6	1
L40-4711-03		Ferri-inductor 470μH	L13	1
L40-1511-13		Ferri-inductor 150μH	L16	1
L71-0208-05		MCF YK-88S	XF1	1
N09-0641-05		Screw		4
N30-3006-46		Round screw 3 x 6		4
R12-1408-05		Trim. pot. 4.7kΩ	VR4,5,9	3
R12-1412-05		Trim. pot. 1kΩ	VR1	1
R12-3427-05		Trim. pot. 10kΩ	VR2,8,12	3
R12-3428-05		Trim. pot. 47kΩ	VR6,7,10	3
R12-6405-05	N	Trim. pot. 470kΩ	VR3,11	2
R90-0559-05	N	Inline block	IB1,3–7	6
R92-0150-05		Short jumper		51

PLL UNIT (X50-1910-00)

Part No.	Remarks	Description	Ref. No.	Q'ty
CC45CH1H050C		C 5P	C10,14,18,24,34,66	6
CC45CH1H120J		C 12P	C67	1
CC45CH1H180J		C 18P	C32	1
CC45CH1H270J		C 27P	C42	1
CC45CH1H330J		C 33P	C13,19,25,38,43	5
CC45RH1H050C		C 5P	C86	1
CC45RH1H070D		C 7P	C89	1
CC34RH1H080D		C 8P	C85,87	2
CC34RH1H100D		C 10P	C84,88	2
CC45RH1H560J		C 56P	C17	1
CC45RH1H680J		C 68P	C9	1
CC45SH1H470J		C 47P	C23	1
CC45SL1H101J		C 100P	C59	1
CC45SL1H151J		C 150P	C41	1
CC45SL1H680J		C 68P	C83	1
CC45SL1H221J		C 220P	C100	1
CC45TH1H050C		C 5P	C29	1
CC45TH1H330J		C 33P	C30	1
CC45TH1H390J		C 39P	C28	1
CE04W1A101M		E 100 10V	C44	1
CE04W1A470M		E 47 10V	C8,11,15,21,27,49,55	7
CE04W1V100M		E 10μ 16V	C78	1
CK45B1H102K		C 0.001	C77,91–93,101	5
CK45B1H222K		C 0.0022	C5	1
CK45F1H103Z		C 0.01	C1–4,12,16,22,26,33,36,54,57,62,69–74,79,82,90,97,98	24
CK45F1H223Z		C 0.022	C94–96	3
CQ92M1H102K		ML 0.001	C47	1
CQ92M1H104K		ML 0.1	C46	1
C91-0119-05		C 0.047 (SR)	C37,39,48,52,65	5
C91-0131-05		C 0.01	C6	1
C91-0456-05		C 0.047	C7,31,35,40,45,50,51,53,58,60,63,64,68,75,81,99,102	17
E04-0157-04		Mini pin jack A		1
E23-0046-04		Square terminal		2
E40-0273-05		Mini connector 2P		2
E40-0473-05		Mini connector 4P		2
E40-0673-05		Mini connector 6P		1
J31-0502-04		PC board collar		6
J42-0428-05		PC board bushing		6
L19-0344-05	N	Wide bandwidth transf.	T5	1
L34-0851-05		Tuning coil	T6,9	2
L34-0852-05		Tuning coil	T1	1
L34-0853-05		Tuning coil	T2	1
L34-0854-05		Tuning coil	T3	1
L34-0855-05		Tuning coil	T4	1
L34-0856-05		Tuning coil	T7,8	2
L40-1011-03		Ferri-inductor 100μH	L23,27	2
L40-1011-14		Ferri-inductor 100μH	L32	1
L40-1511-03		Ferri-inductor 150μH	L9,11,20,21,25	5
L40-2282-01		Ferri-inductor 0.22μH	L15	1
L40-3301-03		Ferri-inductor 33μH	L22	1
L40-3382-01		Ferri-inductor 0.33μH	L14,16,17	1
L40-4701-03		Ferri-inductor 47μH	L5–8,26,30,31	7
L40-4711-03		Ferri-inductor 470μH	L10,18,19,24,28,29	6
L40-4711-13		Ferri-inductor 470μH	L13,33	2
L40-4782-02		Ferri-inductor 0.47μH	L12	1
R92-0150-05		Short jumper		12

PARTS LIST

FILTER UNIT (X51-1290-00)

Part No.	Re marks	Description	Ref. No.	Q'ty
C05-0043-05		Ceramic trimmer 20P	TC1	1
CC45SL2H030C		C 3P 500V	C82	1
CC45SL2H100D		C 10P 500V	C65,72	2
CC45SL2H101J		C 100P 500V	C35,60	2
CC45SL2H120J		C 12P 500V	C14	1
CC45SL2H121J		C 120P 500V	C38,51,40	3
CC45SL2H180J		C 18P 500V	C46	1
CC45SL2H151J		C 150P 500V	C4,7	2
CC45SL2H181J		C 180P 500V	C3,18,24,34,57, 68	6
CC45SL2H221J		C 220P 500V	C15,26,39,47,79	5
CC45SL2H271J		C 270P 500V	C21	1
CC45SL2H330J		C 33P 500V	C37,52	2
CC45SL2H391J		C 390P 500V	C12,29,36	3
CC45SL2H470J		C 47P 500V	C23,48,55,61	4
CC45SL2H471J		C 470P 500V	C6,8,17,25	4
CC45SL2H560J		C 56P 500V	C13,45,64,71	4
CC45SL2H680J		C 68P 500V	C28,43,58,81	4
CC45SL2H681J		C 680P 500V	C9	1
CC45SL2H820J		C 82P 500V	C98,106	2
CE04W1C100M		E 10 16V	C84	1
CE04W1H010M		E 1 50V	C88	1
CE04W1HR47M		E 0.47 50V	C86	1
CK45F1H103Z		C 0.01	C1,74,75,77,78, 83,87,93,94,99, 102–104	13
CK45F1H473Z		C 0.047	C19,31,32,41,42, 53,54,62,73,76, 80,85,105	13
CM93D2H102J		MC 0.001	C16	1
CM93D2H182J		MC 0.0018	C5	1
CM93D2H821J		MC 820P	C95	1
C91-0119-05		C 0.047 (SR)	C2,10,11,20,63, 89–92,101	10
E04-0154-04		Coax. connector		1
E04-0157-04		Mini pin jack		1
E23-0512-04		Square terminal		2
E29-0413-05		1P connector (female)		1
E40-0273-05		Mini connector 2P		4
E40-0373-05		Mini connector 3P		3
E40-0473-05		Mini connector 4P		2
E40-0673-05		Mini connector 6P		1
J31-0502-04		PC board collar		6
J42-0428-05		PC board bushing		6
L33-0672-05		Ferri-inductor 100μH	L21–36	16
L34-3038-05		LPF coil A 1.5–2.5	L1	1
L34-3039-05		LPF coil B 1.5–2.5	L2	1
L34-3054-05	N	LPF coil E 4–6.5	L5	1
L34-3055-05	N	LPF coil F 4–6.5	L6	1
L34-3056-05	N	LPF coil G 6.5–10.5	L7	1
L34-3057-05	N	LPF coil H 6.5–10.5	L8	1
L34-3058-05	N	LPF coil J 10.5–16	L9	1
L34-3059-05	N	LPF coil K 10.5–16	L10	1
L34-3060-05	N	LPF coil L 16–23	L11,12	2
L34-3062-05	N	LPF coil N 23–30	L13,14	2
L34-3081-05	N	LPF coil C 2.5–4	L3	1
L34-3082-05	N	LPF coil D 2.5–4	L4	1
L39-0406-05		Detector coil	T1	1
L40-1011-13		Ferri-inductor 100μH	L4	1
L40-1011-14		Ferri-inductor 100μH	L37–40	4
L40-1021-03		Ferri-inductor 1mH	L15–17	3
L40-1511-03		Ferri-inductor 150μH	L18,19	2
R12-0427-05		Trim. pot. 500Ω	VR5	1
R12-2410-05		Trim. pot. 5kΩ	VR4	1
R12-3434-05		Trim. pot. 10kΩ	VR3	1
R12-4411-05		Trim. pot. 50kΩ	VR1,2	2
RC05GF2H181J		Solid 180Ω 1/2W	R40	1
R92-0150-05		Short jumper		20
S51-1404-05		Relay G2E	RL2–15	14
S51-2407-05		Relay FBR321	RL1	1

CONTROL UNIT (X53-1290-00)

Part No.	Re marks	Description	Ref. No.	Q'ty
C05-0035-05		Ceramic trimmer 50P	TC1	1
C05-0067-05		Ceramic trimmer 25P	TC5,6	2
C05-0309-05		Ceramic trimmer 40P	TC2–4	3
CC45CH1H0R5C		C 0.5P	C47	1
CC45CH1H020C		C 2P	C31,116,135	3
CC45CH1H150J		C 15P	C3,30,33,36,178, 179	6
CC45CH1H220J		C 22P	C136	1
CC45CH1H560J		C 56P	C29,38	2
CC45RH1H030C		C 3P	C58	1
CC45RH1H050C		C 5P	C67	1
CC45RH1H070D		C 7P	C57	1
CC45RH1H100D		C 10P	C56	1
CC45RH1H120J		C 12P	C6,66,68	3
CC45RH1H220J		C 22P	C16,18,55,124	4
CC45RH1H270J		C 27P	C127	1
CC45RH1H560J		C 56P	C115,117	2
CC45RH1H820J		C 82P	C100	1
CC45SL1H030C		C 3P	C144	1
CC45SL1H050C		C 5P	C40,42,85,144	4
CC45SL1H100D		C 10P	C32,86,110	3
CC45SL1H101J		C 100P	C12,41,92,94, 114,133,143	7
CC45SL1H120J		C 12P	C84	1
CC45SL1H150J		C 15P	C43,112	2
CC45SL1H151J		C 150P	C140	1
CC45SL1H221J		C 220P	C93,107	2
CC45SL1H270J		C 27P	C24,26	2
CC45SL1H470J		C 47P	C211	1
CC45SL1H560J		C 56P	C25	1
CC45SL1H680J		C 68P	C108	1
CC45TH1H120J		C 12P	C6	1
CC45TH1H150J		C 15P	C54	1
CC45TH1H270J		C 27P	C53,58	2
CC45UJ1H030C		C 3P	C5,17	2
CC45UJ1H120J		C 12P	C4	1
CC45UJ1H180J		C 18P	C39	1
CC45UJ1H220J		C 22P	C82,106,213	3
CC45UJ1H221J		C 220P	C105	1
CC45UJ1H270J		C 27P	C126	1
CC45UJ1H330J		C 33P	C139	1

PARTS LIST

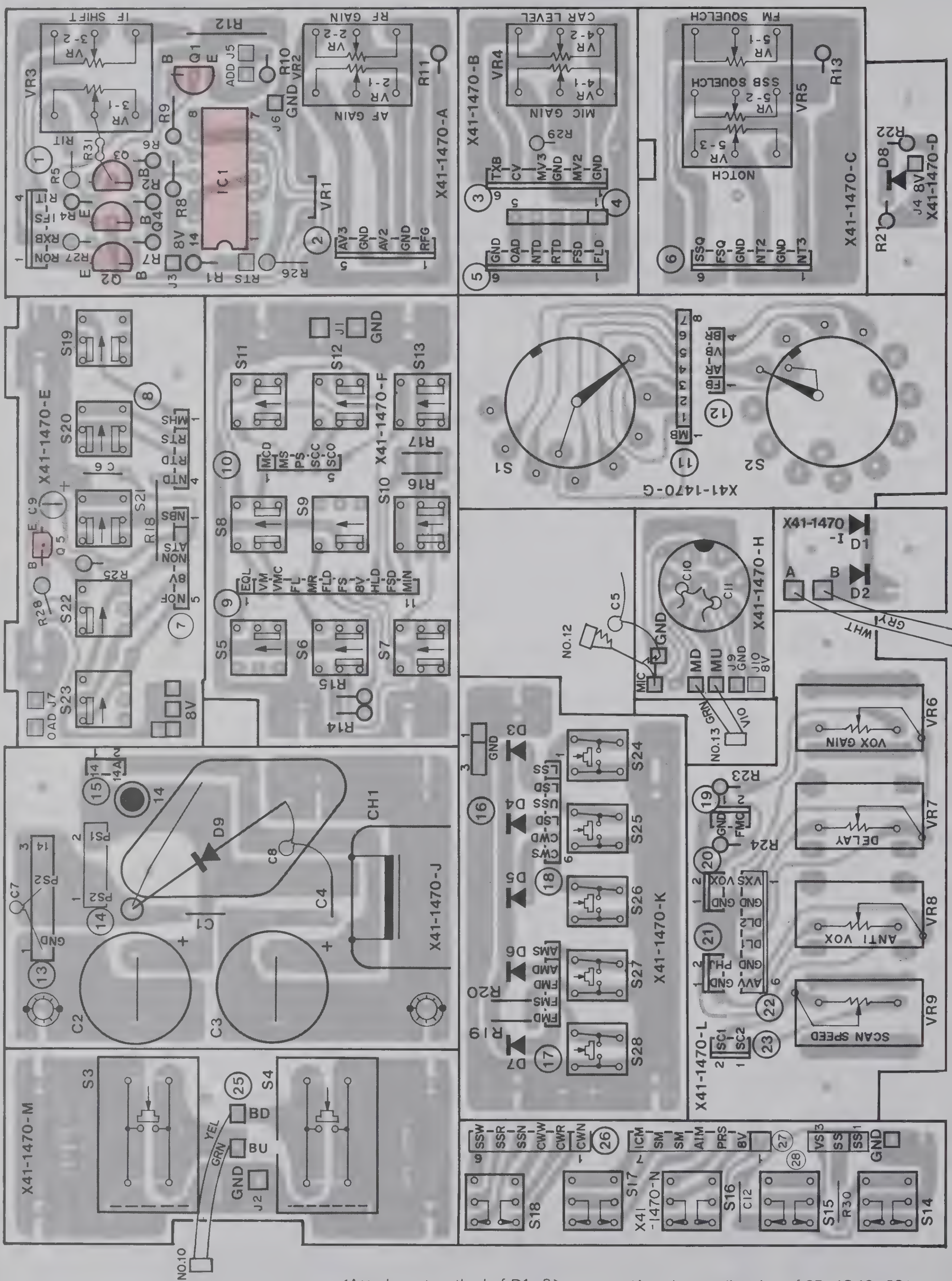
Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1A101M		E 100 10V	C48,79,118,119,175	5
CE04W1A470M		E 47 10V	C75,147,151,163	4
CE04W1H010M		E 1 50V	C148,174	2
CE04W1H3R3M		E 3.3 50V	C150	1
CE04W1HR47M		E 0.47 50V	C129,195,196,149	4
CK45B1H102K		C 0.001	C34,155,158–162,202,205,212	10
CK45B1H222K		C 0.0022.	C52,80	2
CK45B1H471K		C 470P	C132,142	2
CK45F1H103Z		C 0.01	C1,7–11,13–15,19–23,27,35,37,44,45,59–65,69–72,81,87–89,91,95,102,103,104,109,111,113,123,125,128,130,131,134,137,138,141,145,146,165–173,177,180–194,200,201,206,209,210	83
CK45F1H223Z		C 0.022	C197	1
CQ92M1H102K		ML 0.001	C50	1
CQ02M1H104K		ML 0.1	C51	1
CQ92M1H152K		ML 0.0015	C76	1
CQ92M1H683K		ML 0.068	C77	1
CQ92M1H822K		ML 0.0082	C154	1
C91-0131-05		C 0.01	C203	1
C91-0456-05		C 0.047	C2,28,46,49,73,74,78,90,96–99,120,121,122,156,164,176,198,199,204,207,208	23
C91-0457-05		C 0.022	C153,157	2
E04-0157-05		Mini pin jack A		1
E23-0046-04		Square terminal		5
E40-0273-05		Mini connector 2P		8
E40-0274-05		Mini connector 2P		1
E40-0373-05		Mini connector 3P		4
E40-0473-05		Mini connector 4P		8
E40-0573-05		Mini connector 5P		4
E40-0673-05		Mini connector 6P		1
E40-0773-05		Mini connector 7P		2
E40-0873-05		Mini connector 8P		1
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7
L32-0198-05		OSC coil	L10	1
L32-0201-05		OSC coil 8.83MHz	T14	1
L32-0639-05		OSC coil	L18	1
L33-0636-05		Choke coil 28µH	L31	1
L33-0663-05	N	Choke coil 1µH	L12	1
L33-0664-05	N	Choke coil 2.7µH	L22	1
L33-0665-05	N	Choke coil 39µH	L23	1
L34-2140-05	N	Tuning coil 9.67MHz	T10	1
L34-2141-05	N	Tuning coil 9MHz	T12,13	2
L34-3064-05	N	BPF coil 43MHz	T1,3,4,6	4
L34-3065-05	N	BPF coil 43MHz	T2	1
L34-3066-05	N	BPF coil 34MHz	T5	1
L34-3067-05	N	BPF coil 42.5MHz	T7,9	2
L34-3068-05	N	BPF coil 42.5MHz	T8	1
L40-1011-03		Ferri-inductor 100µH	L1,4–7,11,13–15,17,27,35	12
L33-0672-05		Ferri-inductor 100µH	L36–41	6
L40-1011-04		Ferri-inductor 100µH	L25,26	2
L40-1021-03		Ferri-inductor 1mH	L8,9	2
L40-1511-03		Ferri-inductor 150µH	L34,43	2
L40-2201-03		Ferri-inductor 22µH	L2,3,42	3
L40-2211-03		Ferri-inductor 220µH	L16,19,20,24,30,32,33	7
L40-4711-03		Ferri-inductor 470µH	L21,28,29	3
L72-0336-05	N	Ceramic filter 9.65MHz	CF1	1
L77-0485-05		Crystal 8.8315MHz	X2	1
L77-0486-05		Crystal 8.8285MHz	X1	1
L77-0978-05	N	Crystal 36MHz	X4	1
L77-0979-05	N	Crystal 39.225MHz	X5	1
L77-0980-05	N	Crystal 8.7915MHz	X3	1
L77-0981-05	N	Crystal 9MHz	X6	1
L78-0005-05		Ceramic OSC 5.75MHz	X7	1
R12-1038-05		Trim. pot. 1kΩ	VR1,2	2
R12-1040-05		Trim. pot. 4.7kΩ	VR3	1
R90-0515-05		Resistor block 10kΩ x 4	RB1	1
R90-0561-05	N	Resistor block 22kΩ x 6	RB3	1
R90-0562-05	N	Resistor block 22kΩ x 8	RB2	1
R92-0150-05		Short jumper		94
S31-1005-05		Slide switch	S1	1

DISPLAY UNIT (X54-1710-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W0J221M		E 220 6.3V	C2	1
CE04W1A470M		E 47 10V	C1	1
CE04W1V100M		E 10 35V	C3,5–7	4
CQ92M1H103K		ML 0.01	C4	1
C91-0456-05		C 0.047	C8	1
E40-0273-05		Mini connector 2P		1
E40-0473-05		Mini connector 4P		1
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		1
L19-0305-05		OSC transf.	T1	1
L40-1011-04		Ferri-inductor 100µH	L1	1
L40-1511-03		Ferri-inductor 150µH	L2	1
N30-2604-46		Round screw 2.6 x 4		6
N87-3006-46		Self tapping screw 3 x 6		2
R90-0511-05		Resistor block 47kΩ x 8	RB1	1
R90-0521-05		Resistor block 47kΩ x 7	RB2	1
R92-0150-05		Short jumper		11

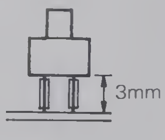
TS-430S PC BOARD VIEW

SWITCH UNIT (X41-1470-00) **Component side view**

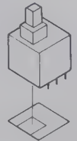


Q1–4 : 2SC945(R) Q5 : 2SC1815(Y) D1,2,6–8 : SY438D D3–5 : SG238D D9 : S31C(S)
IC1 : TC4011BP

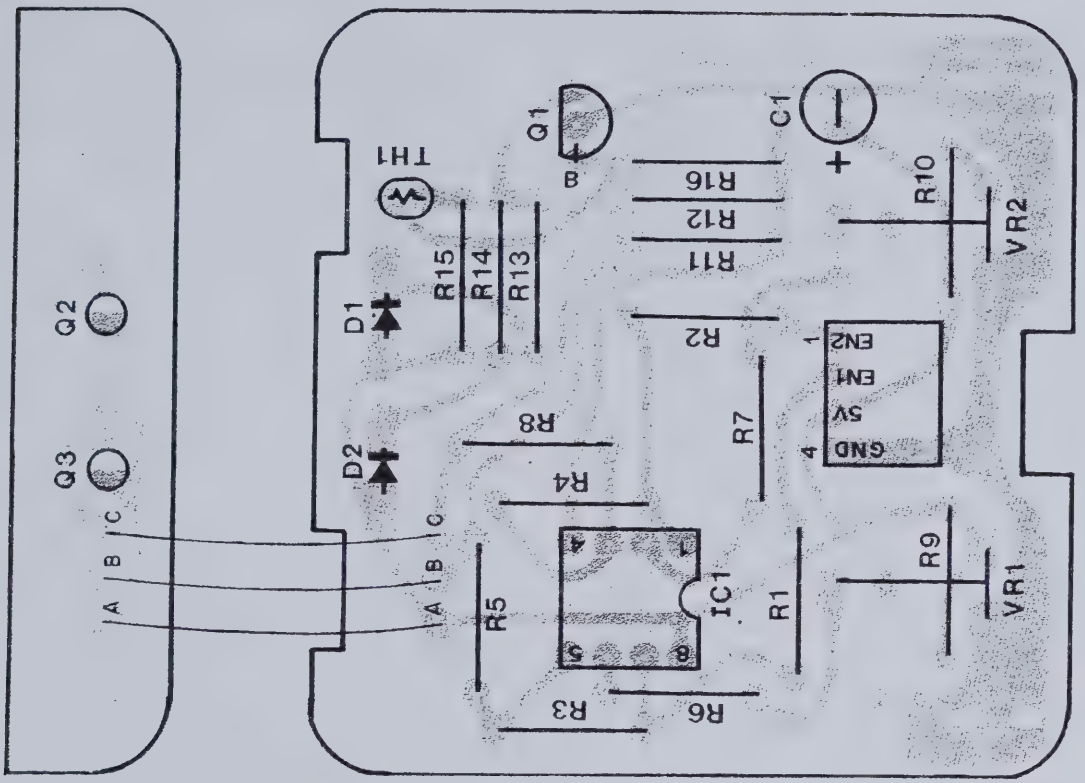
<Attachment method of D1–8>



<Attachment direction of S5–13,19–23>

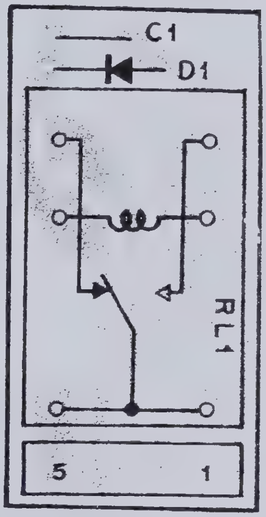


ENCODER ASS'Y (J25-3141-04) **Component side view**



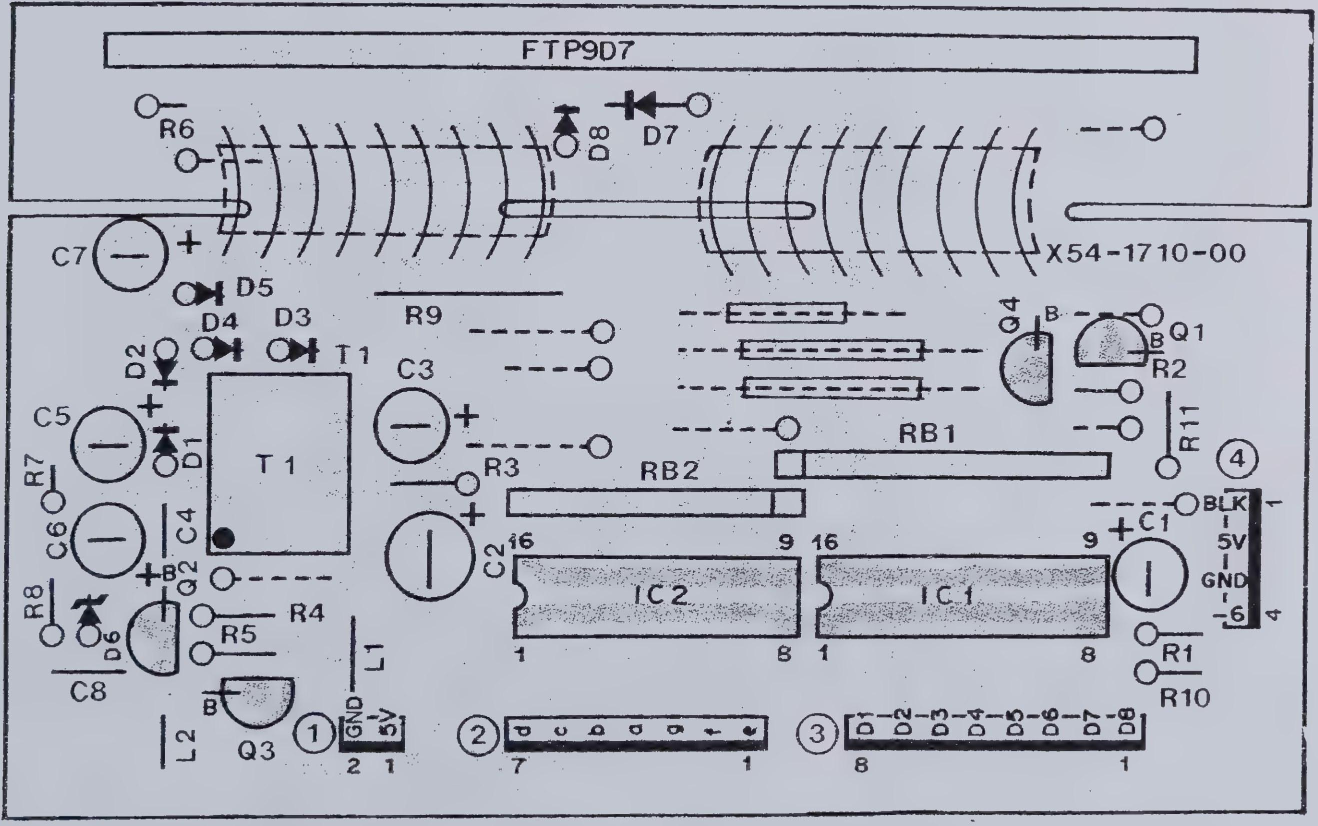
Q1 : 2SA1015(Y) Q2,3 : PN126S
D1,2 : LN66(R)
IC1: LM358P

RELAY BOARD
Component side view



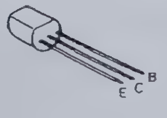
D1 : 1S1555

DISPLAY UNIT (X54-1710-00) **Component side view**

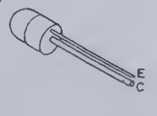


Q1,4 : 2SA1015(Y) Q2,3 : 2SC1959(Y)
D1—4,7,8 : 1S1555 D5 : RD9.1EB2 D6 : RD6.2EB2

2SC945
2SC1015
2SC1815
2SC1959

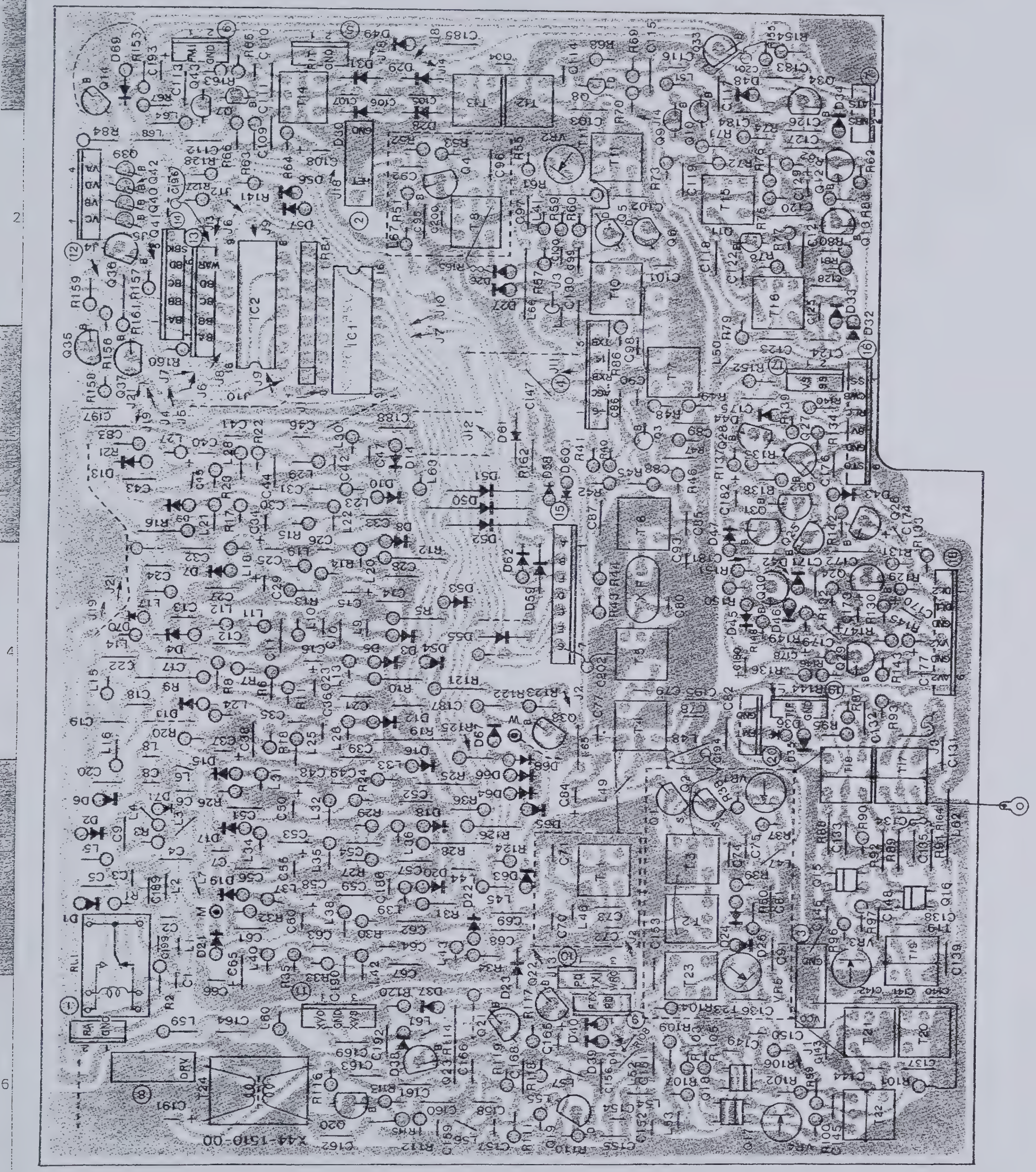


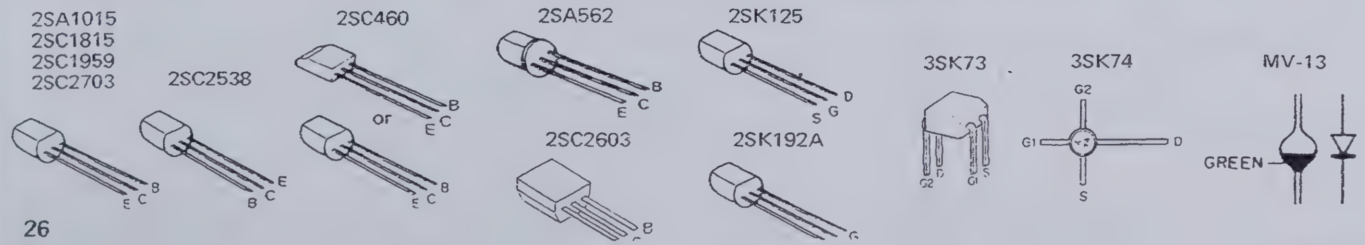
PN126S



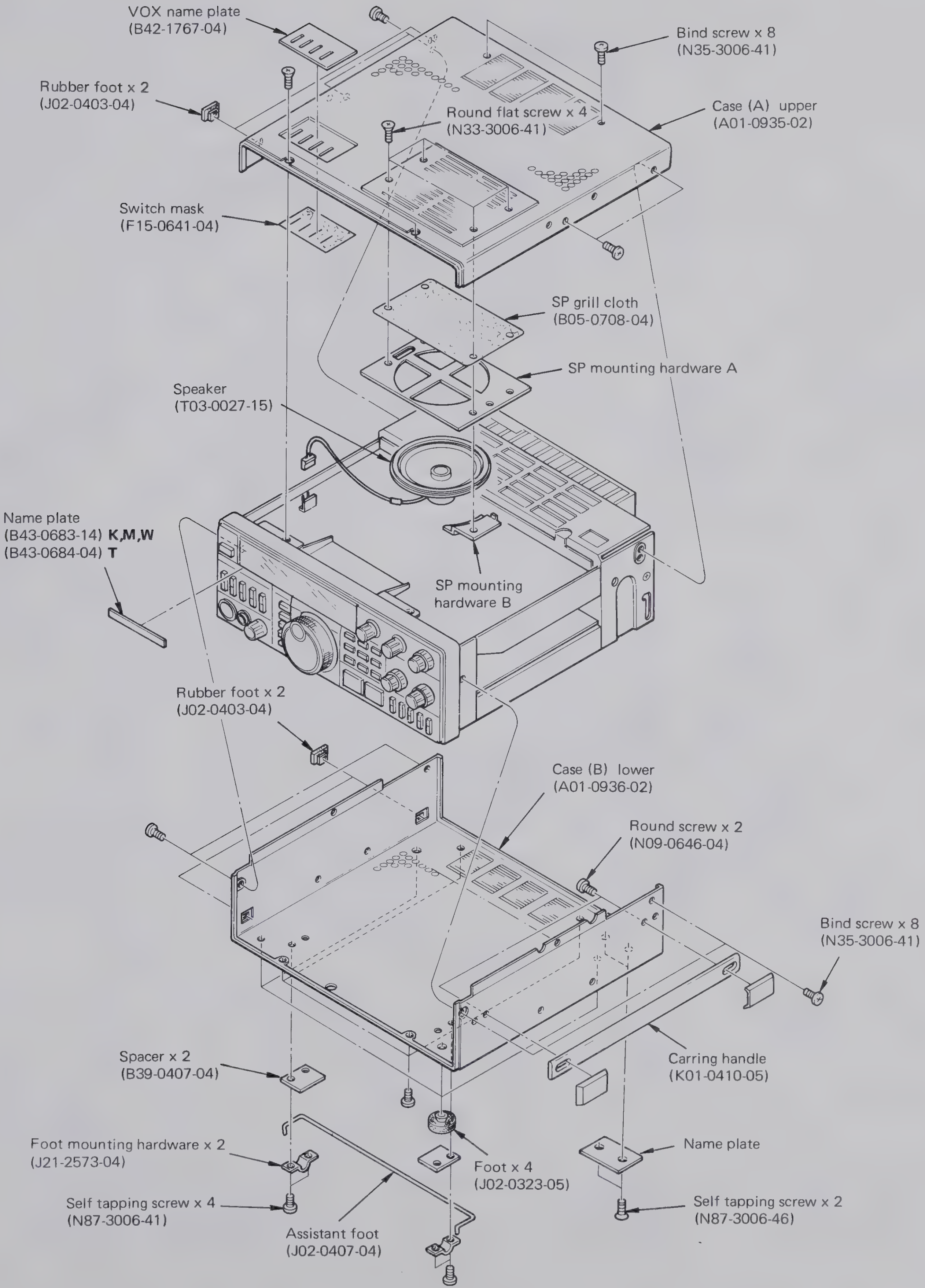
TS-430S PC BOARD VIEW

RF UNIT (X44-1510-11) **Component side view**





DISASSEMBLY



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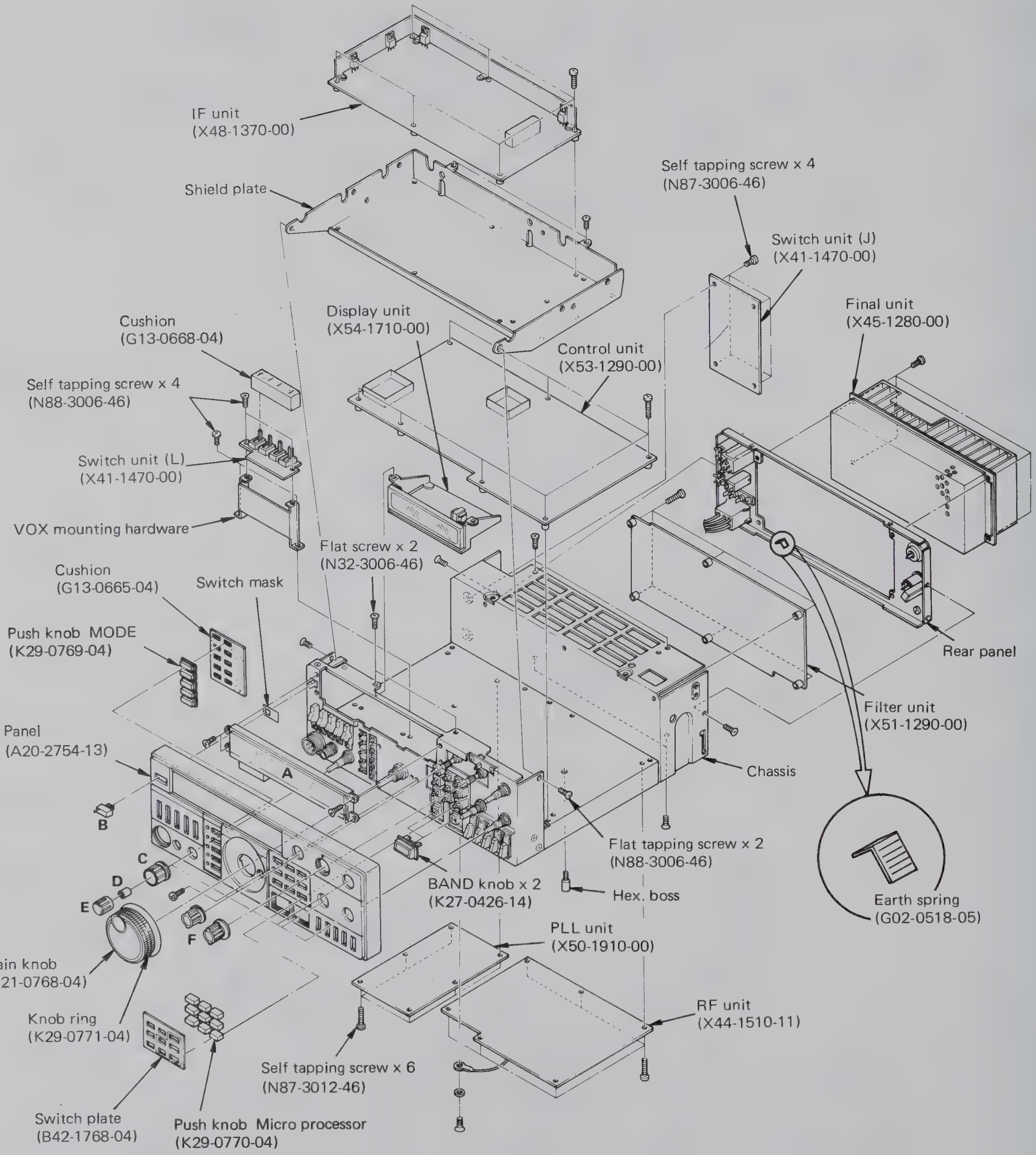


A Meter
(B31-0639-05)

B Push knob POWER
(K29-0758-04)

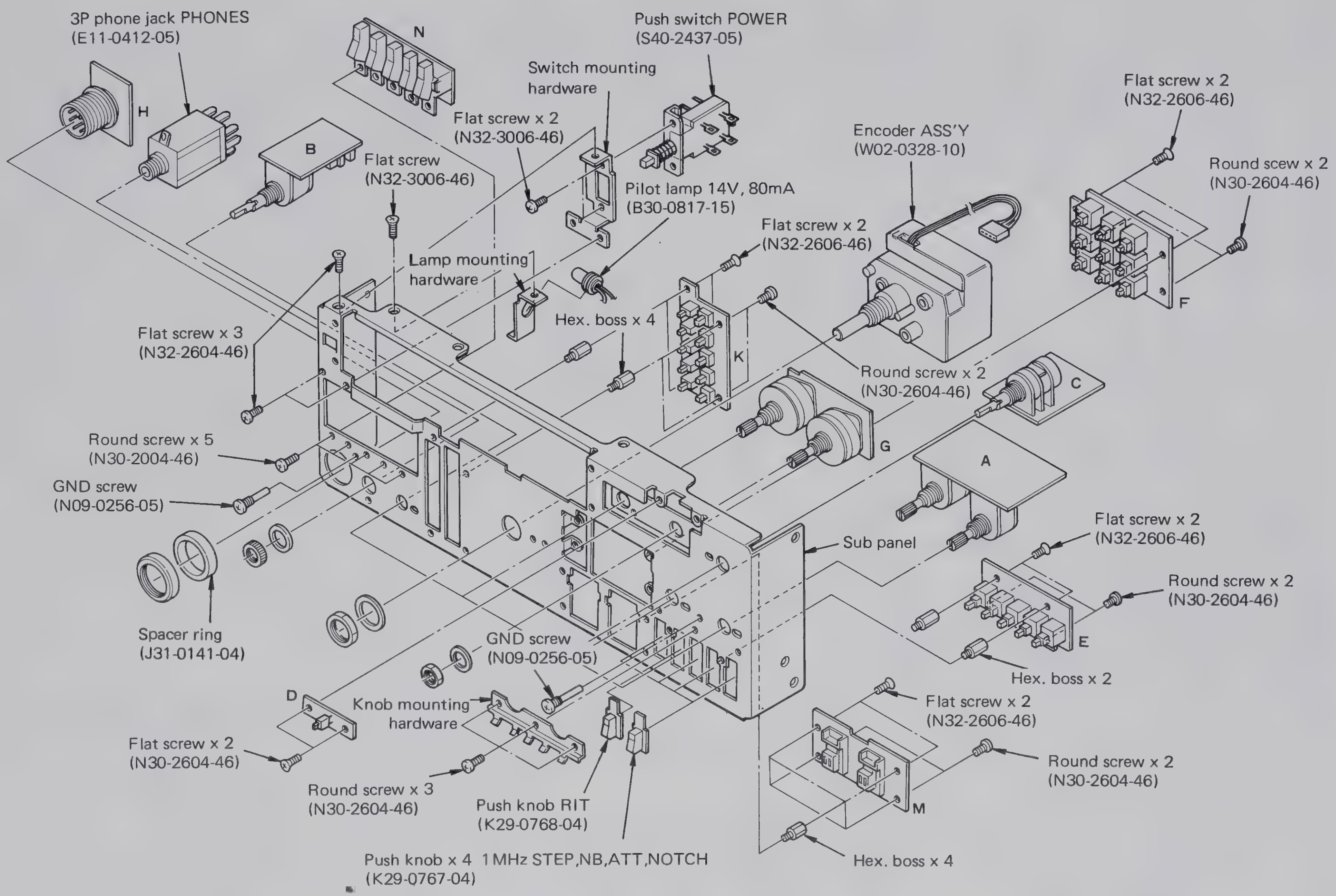
C Knob (outside) x 4 RF,CAR,SQL,IF SHIFT
(K29-0741-24)

D Knob fixed spring x 4
(G02-0505-05)

E Knob (inside) x 4 AF,MIC,NOTCH,RIT
(K23-0710-04)

F Pointer knob x 2 FUNCTION,M.CH
(K23-0753-04)

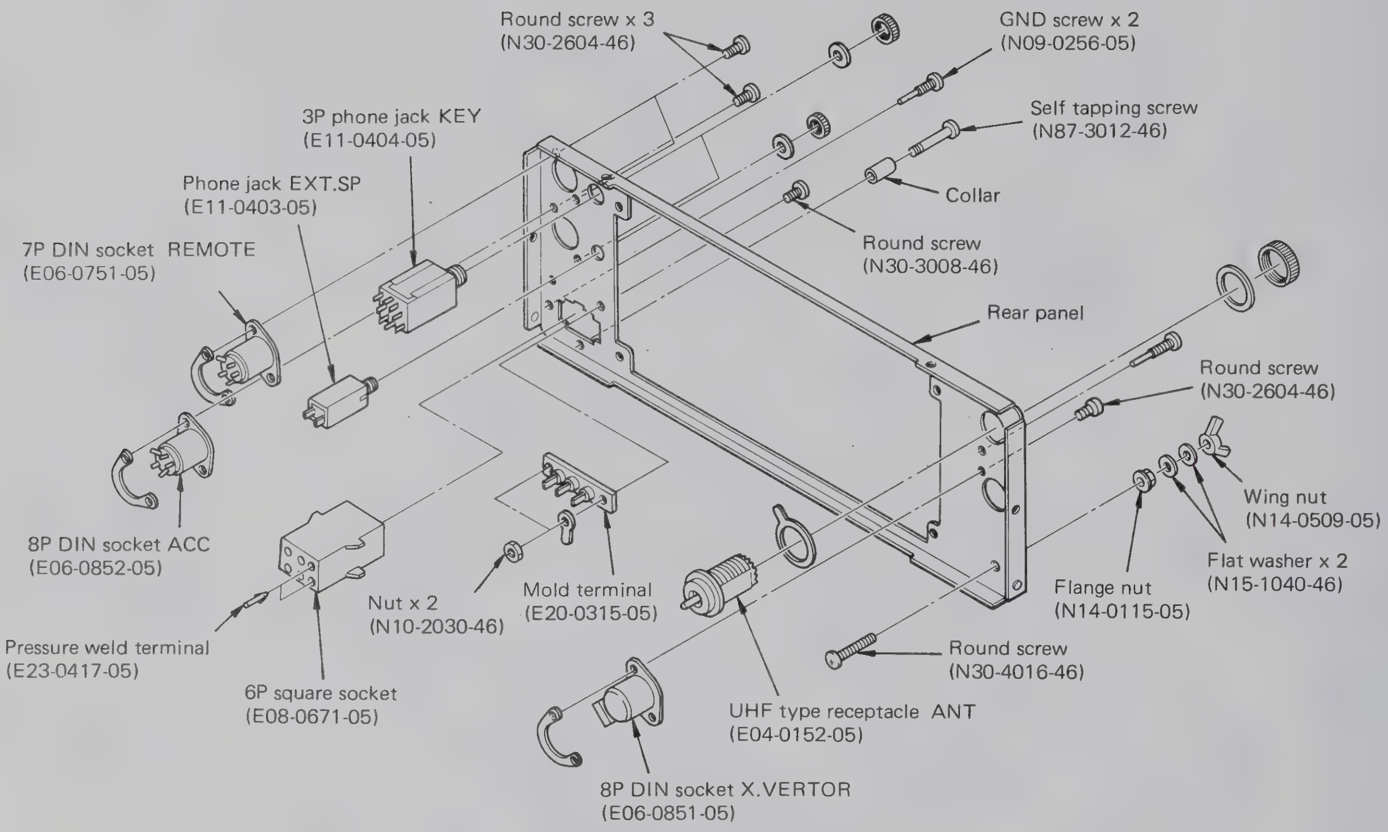
DISASSEMBLY



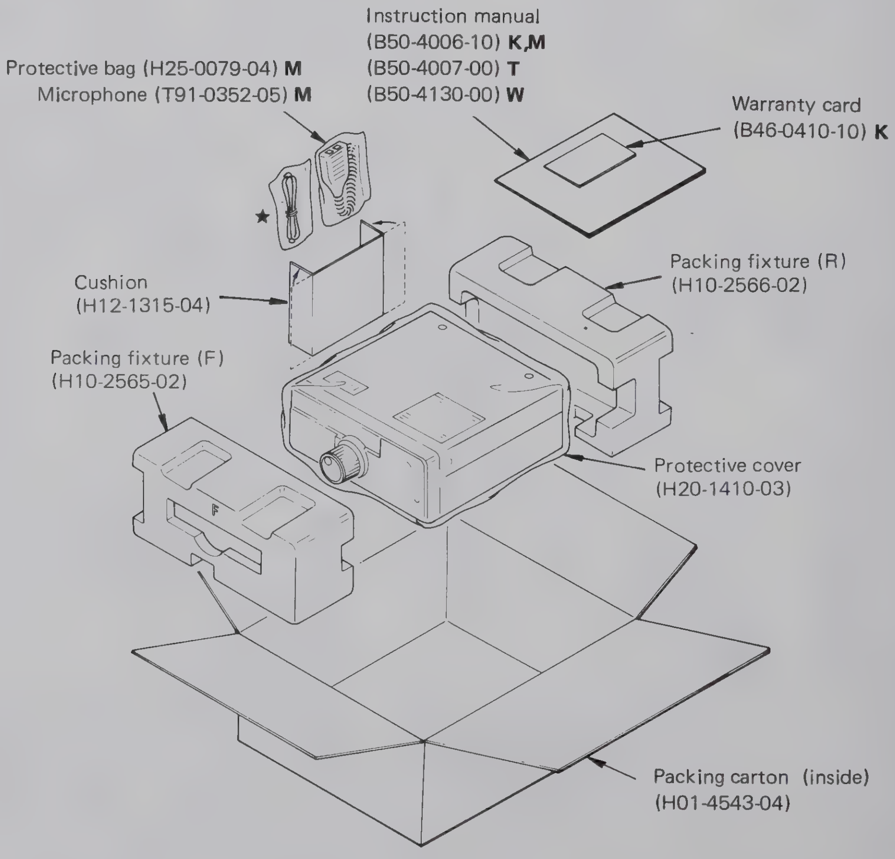
SWITCH UNIT A~N

A	VR2	(R19-3416-05)	Pot. AF/RF
	VR3	(R19-3417-05)	Pot. RIT/IF SHIFT
B	VR4	(R19-3415-05)	Pot. MIC/CAR
C	VR5	(R24-9403-15)	Pot. NOTCH/SQL
D	D8	(SY438D)	LED M.CH
E	S19–23	(S40-2440-15)	Push knob 1MHz STEP, RIT, NB, ATT, NOTCH
F	S5,9,10	(S40-2441-15)	Push knob A=B, MR, M.IN
	S6–8,11–13	(S40-2441-15)	Push knob LOCK, STEP, M.CH, MS, PG.S, HOLD
G	S1	(S29-1428-05)	Rotary switch M.CH
	S2	(S29-1427-05)	Rotary switch FUNCTION
H	–	(E06-0853-05)	8P metal socket MIC
K	S24–28	(S50-1411-05)	Tact switch MODE
	D3–5	(SG238D)	LED LSB, USB, CW
	D6,7	(SY438D)	LED AM, FM
M	S3,4	(S50-1409-05)	Tact switch BAND
N	S14,15	(S36-2408-05)	Paddle switch SEND/REC, VOX/MAN
	S16–18	(S36-2411-05)	Paddle switch PROC, ALC/IC, NAR/WIDE

DISASSEMBLY/PACKING



PACKING

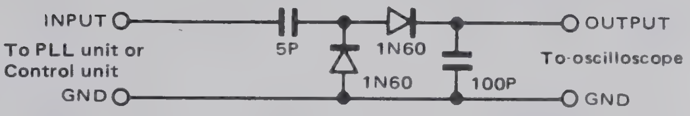


★ Protective bag (H25-0112-04)
- DC cord (E30-1638-05)
- Protective bag (H25-0116-04)
  - 7P DIN plug (E07-0751-05)
  - 8P DIN plug (E07-0851-05)
  - Phone plug (E12-0001-15)
  - CAL cord (E31-2154-04)
  - Fuse 20A (F05-2034-05)

ADJUSTMENT

REQUIRED TEST EQUIPMENT

1. **DC Voltmeter (DC V.M)**
   1) Input resistance : More than 1MΩ
   2) Voltage range : 1.5 to 1000V AC/DC
   NOTE : A high-precision multimeter may be used. However, accurate readings can not be obtained for high-impedance circuits.
2. **DC Ammeter**
   1) Current range : 1.5A, 3A, 20A, High-precision ammeter may be used.
3. **RF VTVM (RF V.M)**
   1) Input impedance : 1MΩ and less than 3pF, min.
   2) Voltage range : 10mV to 300V
   3) Frequency range : 10kHz to 100MHz or greater
4. **AF Voltmeter (AF V.M)**
   1) Frequency range : 50Hz to 10kHz
   2) Input resistance : 1MΩ or greater
   3) Voltage range : 10mV to 30V
5. **AF Generator (AG)**
   1) Frequency range : 200Hz to 5kHz
   2) Output : 1mV or less to 1V, low distortion
6. **AF Dummy Load**
   1) Impedance : 8Ω
   2) Dissipation : 3W or greater
7. **Oscilloscope**
   Requires high sensitivity, and external synchronization capability.
8. **Sweep Generator**
   1) Center frequency : 50kHz to 90MHz
   2) Frequency deviation : Maximum±35MHz
   3) Output voltage : 0.1V or greater
9. **Standard Signal Generator (SSG)**
   1) Frequency range : 50kHz to 50MHz
   2) Output : −20dB/0.1μV to 120dB/1V
   3) Output impedance : 50Ω
   4) AM and FM modulation can be possible.
   NOTE : Generator must ve frequency stable.
10. **Frequency Counter (f. counter)**
    1) Minimum input voltage : 50mV
    2) Frequency range : 50MHz or greater
11. **Noise Generator**
    Must generate ignition noise containing harmonics beyond 30MHz.
12. **RF Dummy Load**
    1) Impedance : 150Ω
    2) Dissipation : 150W or greater
13. **Power Meter**
    1) Impedance : 50Ω
    2) Dissipation : 150W cintinuous or greater
    3) Frequency limits : 60MHz or greater
14. **Spectrum Analyzer**
    1) Frequency range : 100kHz to 110MHz or greater
    2) Bandwidth : 1kHz to 3MHz
15. **Detector**
    1) For adjustment of PLL/VCO BPF



16. **Directional Coupler**
17. **Power supply**
    PS-430
18. **Microphone**
    MC-60A or MC-42S

PREPARATION

Unless otherwise specified, set the controls as follows.

POWER	ON	NAR/WIDE	WIDE
BAND	14	1MHz STEP	OFF
AF	MIN	RIT SW	OFF
RF	MAX	NB SW	OFF
MIC	MIN	ATT SW	OFF
CAR	MIN	NOTCH SW	OFF
NOTCH	CEN	MODE	USB
SQUELCH	MIN	LOCK SW	OFF
MEMORY.CH.	1	STEP SW	OFF
FUNCTION	A	M.CH SW	OFF
SEND/REC	REC	MS SW	OFF
VOX/MAN.	MAN	PG.S	OFF
PROCESSOR SW	OFF	HOLD	OFF

< REFERENCE >

Japanese "SG"	American "SG"
−6dB	0.25μV
0dB	0.5μV
6dB	1μV
12dB	2μV
24dB	8μV
30dB	15.8μV
40dB	50μV
50dB	158μV
60dB	500μV
70dB	1.58mV
80dB	5mV
90dB	15.8mV
100dB	50mV
120dB	0.5V

ADJUSTMENT

VOLTAGE CHECK, ADJUSTMENT

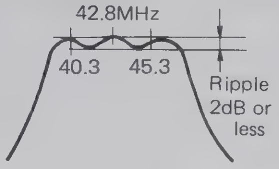
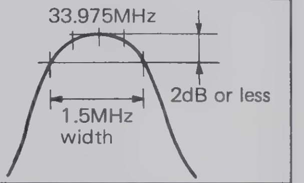
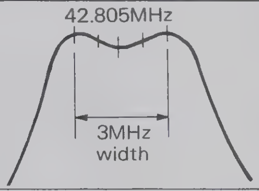
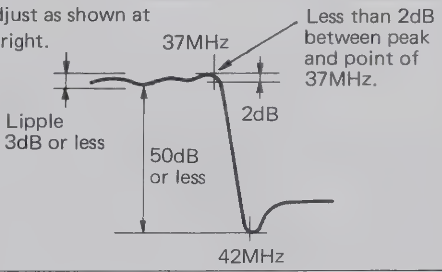
Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Voltage	1) POWER : ON RF GAIN : MAX MODE : USB STBY : REC	DC V.M	IF	⑲-1			Check	7.4–8.4V
				⑲-4				4.75–5.25V
				⑲-2				−5.8 – −6.3V
				⑨-1				8.3–9.1V
				+(BATT)				3.0V or more
				㉕-1	SW"A"	VR1	2.6V***1** or 2.8V***2**	+0.05V,−0V
	2) STBY : SEND			TP4	IF	VR5	8.8V	±0.1V

IF UNIT Q1–3,41 : 3SK73(GR)*1
3SK73(BL)*2

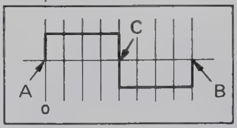
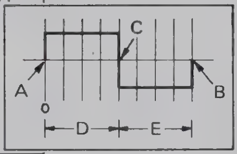
PLL ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Reference oscillator frequency	1) 36MHz	f. counter	Cont	①-2	Cont	TC1	36,000,000Hz	±10Hz
	2) HET (39.225MHz)			HET			Check	39,224,500–39,225,500Hz
2. RIT	1) RIT Pot. : CEN RIT SW : ON STBY : REC	f. counter	Cont	D5 cathode	Cont	TC2	9,000,000Hz	±50Hz Use oscilloscope's probe.
	2) RIT Pot. : Full CW (+)						Verify	8,990,000Hz or less
	RIT Pot. : Full CCW (−)							9,010,000Hz or more
	3) MODE : CW STBY : SEND					VR3	8,992,000Hz	±10Hz
3. CAR	1)	RF VTVM	Cont	③-2	Cont	T14	0.28V (Turn core out from peak)	
	2) MODE : USB IF SHIFT Pot. :CEN STBY : REC	f. counter				TC4	8,831,500Hz	±10Hz*
	STBY : SEND					VR2	No change in freq.	±10Hz
	3) IF SHIFT Pot. : Full CW STBY : REC	* Note : This is an initial adjustment only. You must also perform dyrp 10 of the TX adjustment if you adjust TC3 and or TC4.					Verify	8,832,400Hz or more
	IF SHIFT Pot. : Full CCW							8,830,600Hz or less
	4) MODE : LSB IF SHIFT Pot. : Centerd STBY : REC					TC3	8,828,500Hz	±10Hz*
	5) MODE : CW STBY : SEND					VR1	8,830,700Hz	±10Hz
	6) MODE : FM STBY : SEND					TC5	8,791,500Hz	±10Hz
	7) MODE : AM						Verify	8,789,850–8,790,150Hz
4. VCO-1 (Voltage control oscillator)	1) FREQ : □□,□□0.0kHz To obtain this frequency 1st set dial to □9.9□. Then using mic push button depress UP button one step. (10Hz/step obtained by mic UP or DOWN button).	DC V.M	Cont	TP1	Cont	L18	6.0V	±0.1V
	2) FREQ : □□,□□9.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to □0.0$\boxed{0}$. Then depress mic up or down button one step.						Verify	2.1V±0.5V
5. PLL 9MHz IF	1) RIT SW : OFF	RF VTVM	Cont	IC20-5	Cont	T12,13	MAX	(150mV)
6. PLL 9.65MHz IF	1) FREQ : □□,□□5.0kHz RIT SW : OFF	RF VTVM	Cont	Q68-C	Cont	T10	MAX	(160mV)

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
7. PLL 42.8MHz BPF	1) Connect a 0.01μF capacitor between Q14 Base and GND. (To stop oscillation) Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscilloscope	Cont TP3	IC21-5	Cont	T7,8,9	Adjust as shown at right.	
8. PLL 33.975MHz BPF	1) Connect a 0.01μF capacitor between Q14 Base and GND. (Stop oscillation) Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscilloscope	Cont TP5	IC22-5	Cont	T4,5,6	Adjust as shown at right.	
9. PLL 42.805MHz BPF	1) Disconnect connector ② VC2. Reconnect connector ② after adjustment. Connect a 0.01μF capacitor between D15 cathode and GND. Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscilloscope	Cont	TP5 ②-2	Cont	T1,2,3	Adjust as shown at right.	
10. VCO-2	1) FREQ : ☐☐,000.0$\boxed{0}$ kHz To obtain this frequency 1st set dial to ☐,999.9$\boxed{9}$. Then using mic push button depress UP button one step.	DC V.M	Cont	TP4	Cont	L10	6.5V	±0.1V
	2) FREQ : ☐☐,999.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to ☐,000.0$\boxed{0}$. Then using mic push button depress DOWN button one step.						Check	2.1V±0.5V
11. VC2 level		RF VTVM	Cont	Connector ②	Cont	TC6	50mV	±1dB
12.VCO-BPF	1) Disconnect PLL unit connector ② . Reconnect connector ② after adjustment. Connect 560Ω resistor in Tracking Gen. output line. Use high impedance probe to connect to spectrum analyzer. (or connect 150Ω in seriers)	Tracking Gen. Detector Spectrum analyzer	PLL	IC6-1 TP2	PLL	T6–9	Adjust as shown at at right.	 Less than 2dB between peak and point of 37MHz. 37MHz Lipple 3dB or less 2dB 50dB or less 42MHz
13. VCO-3A	1) FREQ : 7,499.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to 7,500.0$\boxed{0}$. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T1	2.1V	±0.1V
	2) FREQ : 0,000.0kHz						Check	6.5V or less
14. VCO-3B	1) FREQ : 15,999.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to 16,000.0$\boxed{0}$. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T2	2.1V	±0.1V
	2) FREQ : 7,500.0$\boxed{0}$ kHz						Check	6.5V or less
15. VCO-3C	1) FREQ : 22,999.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to 23,000.0$\boxed{0}$. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T3	2.1V	±0.1V
	2) FREQ : 16,000.0$\boxed{0}$ kHz						Check	6.5V or less

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
16. VCO-3D	1) FREQ : 29,999.9$\boxed{9}$ kHz Turn VFO to frequency stop.	DC V.M	PLL	TP1	PLL	T4	1.6V	±0.1V
	2) FREQ : 23,000.0$\boxed{0}$ kHz						Check	6.5V or less
17. Encoder	1) Remove the VFO knob and motor-drive the encoder at approx. 300 rpm.	Oscilloscope	Cont	㉓-3				Point C may be located anywhere. When a motor is not available, manually turn the VFO to check the duty ratio.
	2) EN1 duty ratio adjustment : Turn both CW and CCW				Encoder	VR1		After adjusting with the VFO control turned CW, check that intervals D and E are also indentical when the VFO control is turned CCW.
	3) EN2 duty ratio adjustment : Turn in the both directions.			㉓-2		VR2	Adjust until intervals D and E are equal to each other·with point C placed at the center.	

RX ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. IF AMP	1) FREQ : 160.0kHz MODE : LSB RF GAIN Control : MAX	SSG AF V.M	Rear panel	ANT EXT. SP	RF	T8,4–7 10–14 VR2	MAX	S/N 10dB or more at –6dBμ input. 1V or more/8Ω at AF GAIN Control MAX.
	Use the minimum SSG input possible during alingment.	Oscilloscope AF Dummy load			IF	L1–4		
	2) FREQ : 29,000.0kHz MODE : FM (If FM-430 is installed) SSG : 1kHz audio at 5kHz dev.				FM IF	VR3 T2	MAX	
2. Internal spurious beat	1) FREQ : 500.0kHz RF GAIN Control : Minimum level possible.				RF	VR1	MIN	
3. RX DET Balance	1) RF GAIN Control : MIN	RF VTVM (Oscilloscope)	IF	TP1	IF	VR1 TC1	MIN	
4. 48.055MHz IF trap	1) FREQ : 24,999.9kHz SSG output : 48.055MHz, 80dB RF GAIN Control : Minimum level as possible	SSG AF V.M	Rear panel	ANT EXT. SP	RF	T1	MIN	70dB or more
5. S meter	1) No signal (SSG output : OFF)	S meter			IF	VR2	Set to starting point. (Meter zero)	
	2) FREQ : 14,175.0kHz MODE : USB SSG output : 14,175.0kHz, 8dB	SSG S meter	Rear panel	ANT		L3	S1 Adjust counter clockwise from peak. (turn slug out).	8.0dB±4dB
	3) SSG output : 40dB					VR3	S9	40dB±6dB (50uV)
	4) FREQ : 29,000.0kHz MODE : FM SSG output : 29,000.0kHz, 30dB (If FM-430 is installed.)				FM IF	VR2	Full scale	30dB±10dB

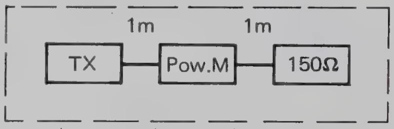
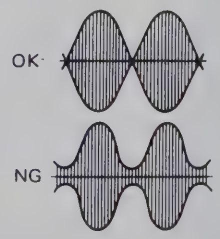
ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
6. Squelch threshold	1) MODE : CW NAR/WIDE SW : WIDE SQL control : 12 o'clock	Speaker		EXT. SP	IF	VR4	Adjust VR slowly and stop at threshold.	12 o'clock
7. Noise Blanker	1) FREQ : 14,175.0kHz NB SW : ON SSG output : 14,175.0kHz First adjust 20dB input, then using the minimum input as possible.	SSG DC V.M (Oscillo-scope)	Rear panel RF	ANT R82	RF	T15, 16	MIN	
	2) Noise Gen. : Low level	Noise Gen. SP	Rear panel	ANT EXT. SP		T15, 16	MIN noise level.	
8. Beeper	1) AF GAIN control : MIN Jumper connector ⑳ to GND.	AF V.M Oscillo-scope AF dummy load		EXT. SP	IF	VR6	50mV/8Ω	

TX ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. IC meter null	1) ALC/IC SW : IC STBY : SEND Disconnect RF and DRV connector. Adjust to minimum current by VR1 and VR2 in Final unit.	S meter			Filter	VR4	Set to S meter "0".	*If this adjustment is performed, step 2.1) Base current must also be performed.
2. Base current	1) MODE : USB MIC LEVEL control : MIN Connect Ammeter ⊕ : EXT power supply ⊕ terminal ⊖ : Power connector ⊕ terminal Adjust to minimum current with VR1 and VR2 in the Final unit. STBY : SEND	Ammeter			Final	VR1	Current drain (Minimum current) +200mA	First adjust VR1 and VR2 for minimum. Adjust VR1 for an increase of 200mA when switched to TX. Then adjust VR2 for 200mA over this reading.
	2) STBY : REC (After adjustment)					VR2	Current drain (Minimum current) + Driver current (200mA)+200mA	
3. TX AMP	1) FREQ : 14,175.0kHz MODE : CW CAR LEVEL control : MAX Disconnect DRV connector from RF unit. Reconnect this connector after adjustment. STBY : SEND	50ΩRF dummy load Oscillo-scope	RF	DRV	IF RF	L9 T17—19 VR3, T20—22 VR4,5	MAX	*If this adjustment is performed, step 8. must also be performed. Readjust VR3,4,5 for Min. sprious, step 8).
4. NULL	1) FREQ : 29,900.0kHz MODE : CW CAR LEVEL control : 50—60W output power STBY : SEND	Power meter	Rear panel	ANT	Filter	VR2 TC1	Mechanically set to 9—10 o'clock. MAX	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
5. ALC (RF output power)	1) FREQ : 14,175.0kHz MODE : CW CAR LEVEL control : ALC scale MAX STBY : SEND	Power meter	Rear panel	ANT	Filter	VR1	95W	Caution : In no case should the power be adjusted for greater than 110 watts.
6. Power down	1) FREQ : 28,500.0kHz MODE : CW CAR LEVEL control : ALC scale MAX Connect ACC socket pin ⑥ to GND. STBY : SEND	Power meter	Rear panel	ANT	Filter	VR3	50W	
7. Protection	1) FREQ : 14,300MHz MODE : CW Connect Ammeter ⊕ : EXT power supply ⊕ terminal ⊖ : Power connector ⊕ terminal Adjust at frequency BAND with maximum current drain. Coax. cable to 150Ω dummy load should be 1m long. STBY : SEND	150ΩRF dummy load Ammeter Power neter	Rear panel 	ANT	Filter	VR2	30W	
	2) ANT : OPEN	Am meter						18A or less
8. Spurious	1) FREQ : 21,200.0kHz MODE : CW CAR LEVEL control : ALC scale MAX STBY : SEND	Spectrum analyzer power meter	Rear panel	ANT (Directional coupler)	RF	VR4,5 VR3	MIN/±5.7MHz MIN/±0.36MHz	*If this adjustment is performed, step 3. must also be performed
9. Carrier suppression	1) FREQ : 14,175.0kHz MODES : USB and LSB MIC LEVEL control : MIN STBY : SEND	Oscilloscope	Rear panel	ANT (Directional coupler)	IF	VR8,9	MIN	−40dB or less
10. SSB mode frequency response	1) FREQ : 14,175.0kHz MODES : USB and LSB AG output : Two tone 7mV 300, 2700Hz Set output to 50W using MIC control. STBY : SEND If two tone generator is not available adjust for equal output power at 300, 2700Hz, as measured on wattmeter.	Oscilloscope	Rear panel	ANT (Directioanl coupler)	Cont	TC4 (USB) TC3 (LSB)	Adjust as shown at right.	*If this adjustment is performed, step 9. must also be performed. 
11. FM IF (If FM-430 is installed)	1) FREQ : 29,000.0kHz MODE : FM STBY : SEND	RF VTVM	FM IF	D2 cathode	FM IF	T1	MAX	
12. Deviation (If FM-430 is installed)	1) FREQ : 29,000.0kHz MODE : FM AG output : 1kHz, 20mV STBY : SEND	Linear detector Power meter (50Ω)	Rear panel	ANT (Directional coupler)	FM IF	VR1	5kHz	
	2) AG output : 2mV						Check	3.5kHz or less

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
13. IC meter	1) FREQ : 14,175.0 kHz MODE : CW CAR LEVEL control : current drain 17.5A Connect Ammeter ⊕ : EXT power supply ⊕ terminal ⊖ : Power connector ⊕ terminal STBY : SEND	IC meter (Power meter)		ANT	Filter	VR5	14A	
14. ALC meter	1) MODE : USB MIC LEVEL control : MIN METER SW : ALC STBY : SEND	ALC meter			IF	VR12	Set to ALC meter starting point.	
	2) FREQ : 14,175.0 kHz AG output : 1 kHz, 5mV MIC LEVEL control : Set to ALC meter starting point.	Power meter (50Ω)		ANT				
	AG output : +6dB				IF	VR11	Adjust for maximum ALC scale reading.	
15. Speech processor	1) MODE : USB MIC LEVEL control : MIN AG output : 1 kHz, 10mV PROC SW : ON and OFF STBY : REC	AM V.M	IF	TP2	IF	VR7	Level should be the same between ON and OFF.	140 mV (Reference value)
16. CW side tone	1) MODE : CW AF GAIN control : 12 o'clock VOX SW : MAN STBY : REC Connect KEY to KEY jack and close the key contacts.	AF V.M Oscilloscope AF dummy load	Rear panel	EXT. SP	IF	VR10	0.63V/8Ω	

ADJUSTMENT

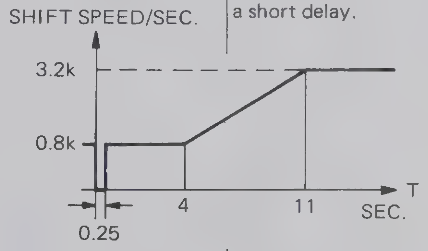
MICROPROCESSOR OPERATION CHECK

Item	Condition	Operation check
1. Reset check	1) FUNCTION SW : A POWER SW : OFF Set the POWER SW ON while depressing the A=B key. Then release the A=B key.	FREQ : 14,000.0kHz MODE : USB VFO A : Lights The "Beeper" sounds simultaneously with POWER ON.
	2) FUNCTION SW : B	FREQ : 14,000.0kHz MODE : USB VFO B : Lights
	3) M.CH SW : ON M.CH SW : change the channels in 1 through 8 order.	The frequency display disappears. M.CH display lights and displays 1–8 in order.
2. Band	1) M.CH SW : OFF 1 MHz STEP SW : OFF Depress the "BAND : UP" key once. Press repeatedly.	FREQ : 18,000.0kHz The "Beeper" sounds simultaneously. The MHz display □□,□ counts up. The "Beeper" sounds simultaneously.
	2) Hold the "BAND : UP" on.	FREQ : 14,000.0 → 18,000.0 ↑ ↓ 10,000.0 21,000.0 ↑ ↓ 7,000.0 24,500.0 ↑ ↓ 3,500.0 28,500.0 ↑ ↓ 1,500.0 ← 29,500.0 The "Beeper" sounds at each Key-press.
	3) Depress the "BAND : DOWN" key once.	FREQ : □□,□00.0kHz Displays 1 MHz lower frequency from that previously displayed in 2). The "Beeper" sounds.
	Repeat the operation.	The frequency display steps down 1 MHz at each key-press. The "Beeper" sounds.
	4) Hold the "BAND : DOWN" key on.	The frequency display in 2) steps down. The "Beeper" sounds at each key-press.
	5) 1 MHz STEP SW : ON Hold the "UP" key on.	FREQ : □□,000.0kHz The MHz display □□ advances 1 MHz at each key-press.
	Hold the "DOWN" key on.	The display steps down 1 MHz at each key-press.

Item	Condition	Operation check
3. Dial	1) FREQ : 0,000.0kHz ① Check to see if the display does not change by turning the VFO control counterclockwise. And adjust the index by turning it in the same way. ② Turn the VFO control slowly clockwise. STEP SW : OFF	One revolution of VFO is 9.5–10kHz.
	2) STEP SW : ON	One revolution of VFO is is 95–100kHz.
4. Memory write	1) FREQ : 14,000.0kHz MODE : USB M.CH SW : 1 M.IN SW : ON	The "Beeper" sounds when "M.IN" key is depressed.
	2) M.CH SW : 6 M.IN SW : ON	
	3) FREQ : 14,010.0kHz M.CH SW : 7 M.IN SW : ON	
	4) M.CH SW : 8 M.IN SW : ON	The "Beeper" sounds continuously when "M.IN" key is depressed.
	5) FREQ : 14,020.0kHz M.CH SW : 8 M.IN SW : ON	The continuous tone stops when the "M.IN" key is depressed.
	6) FREQ : 7,000.0kHz MODE : LSB M.CH SW : 2 M.IN SW : ON	The "Beeper" sounds when the "M.IN" key is depressed.
	7) FREQ : 21,000.0kHz MODE : CW M.CH SW : 3 M.IN SW : ON	
	8) FREQ : 24,500.0kHz MODE : AM M.CH SW : 4 M.IN SW : ON	
	9) FREQ : 29,500.0kHz MODE : FM M.CH SW : 5 M.IN SW : ON	
5. Memory recall (1)	1) M.CH SW : ON STBY SW : REC	"M.CH" display lights.
	M.CH SW :	FREQ. MODE
	1	14,000.0kHz USB
	2	7,000.0kHz LSB
	3	21,000.0kHz CW
	4	24,500.0kHz AM
	5	29,500.0kHz FM
	6	14,000.0kHz USB
	7	14,010.0kHz USB
	2) M.CH SW : 8 STBY SW : REC	FREQ : 14,010.0kHz USB
	STBY SW : SEND	FREQ : 14,020.0kHz USB

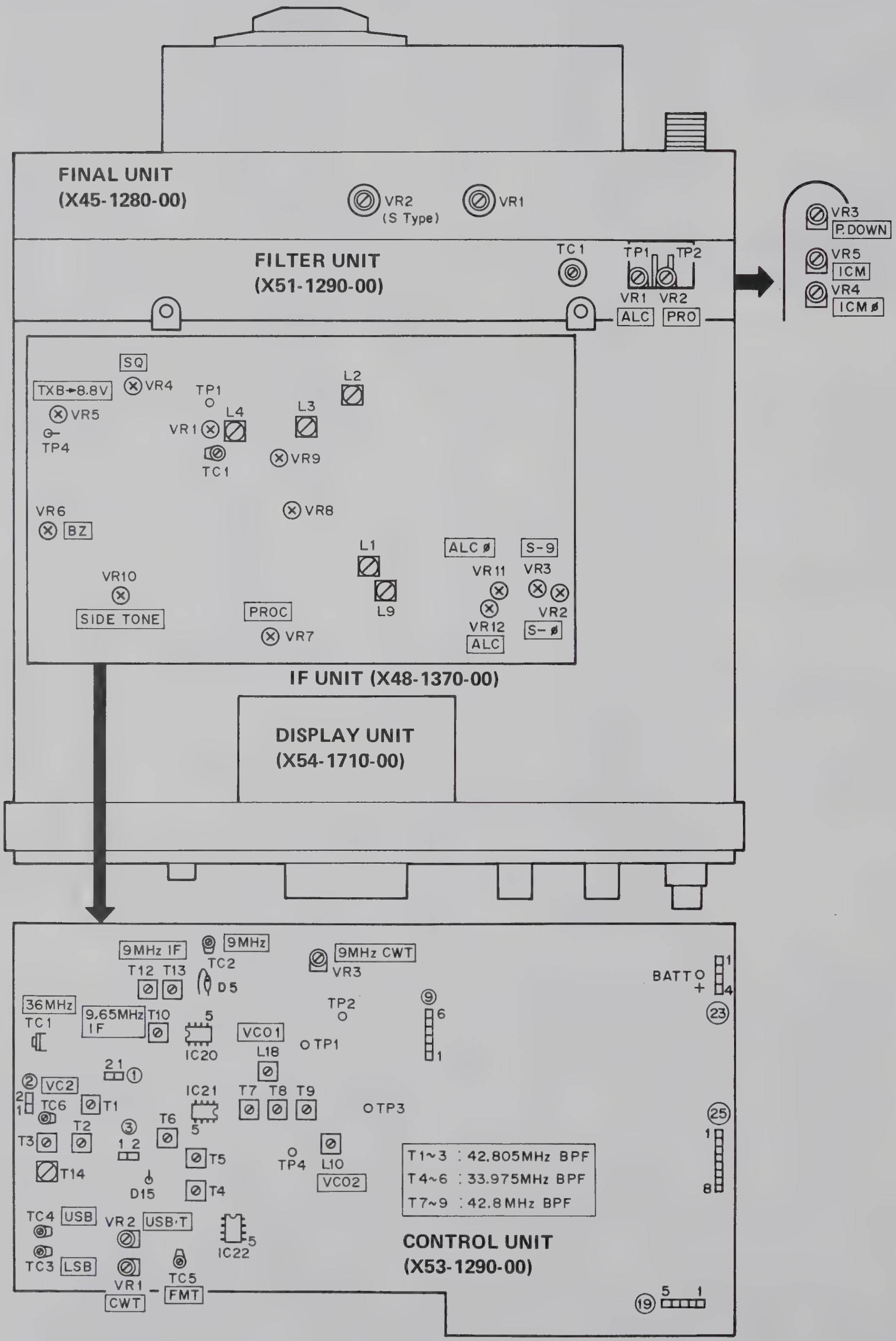
ADJUSTMENT

Item	Condition	Operation check
6. Memory recall (2)	1) M.CH SW : 1 MR SW : ON	FREQ : 14,000.0kHz The "Beeper" sounds.
	2) Turn the VFO both clockwise and counterclockwise.	The display shows normal frequency control.
	3) MR SW : ON	FREQ : 14,000.0kHz The tone sounds simultaneously.
7. Memory erase	1) M.CH SW : 8 STBY : REC Place the M.IN SW : ON While depressing either UP or DOWN BAND SW key.	The frequency display clears after the BAND and M.IN SW keys are released. The "Beeper" sounds.
8. Memory scan	1) MS SW : ON	M.CH : ┌→1→2→3→4┐ └7←6←5←┘ Displays the frequencies and modes in Item 5. 1).
9. Program scan	1) MS SW : OFF PG.S SW : ON PG. SCAN SPEED Pot. : MIN.	The scan starts from M.CH : 6 (FREQ : 14,000.0kHz) to M.CH : 7 (FREQ : 14,010.0kHz). When the frequency reaches 14,010.0kHz, the scan returns to 14,000.0 kHz and starts again. The scan speed is approx. 500Hz/sec. The "Beeper" sounds at the start and at return to the starting frequency.
	PG. SCAN SPEED Pot. : MAX	The scan speed is approx. 2.5kHz/sec. (five times faster then MIN).
	2) HOLD SW : ON	The scan stops
	Turn the VFO clockwise.	The scan repeats within the preset range from M.CH : 6 → M.CH : 7 The "Beeper" sounds at the start and at return to the starting frequency.
	Turn the VFO counterclockwise	The scan stops at the frequency preset in M.CH : 6.
	3) HOLD SW : OFF	The scan resumes from the displayed frequency.

Item	Condition	Operation check
10. A=B (Function)	1) MS SW : OFF PG.S SW : OFF M.CH SW : OFF FUNCTION : B FREQ : 7,000.0kHz MODE : LSB	"VFO B" display lights.
	FUNCTION : A FREQ : 14,000.0kHz MODE : USB	"VFO A" display lights.
	2) FUNCTION : A A=B SW : ON FUNCTION : B	FREQ : 14,000.0kHz MODE : USB FREQ : 14,000.0kHz MODE : USB
11. UP/DOWN (Microphone)	1) Connect a microphone (MC-60A or MC-42S). Momentarily depress the "UP" key several times.	When the 100Hz digit changes, the 100Hz upper frequency is displayed after ten key-presses.
	2) Hold the "UP" key on. 	The frequency continuously advances forward after a a short delay.
	3) Momentarily depress the "DOWN" key.	When the display of 100Hz range changes, the 100Hz lower frequency is displayed after ten key-pressed.
	4) Hold the "DOWN" key on.	The frequency continuously advences backward after a short delay.
12. Lock	1) LOCK SW : ON Turn the VFO both clockwise and counter-clockwise.	The frequency displayed at lock does not change.
	2) Depress both BAND UP and DOWN keys.	
	3) Hold the microphone (MC-60A or MC-42S) "UP" and "DOWN" key on.	

ADJUSTMENT

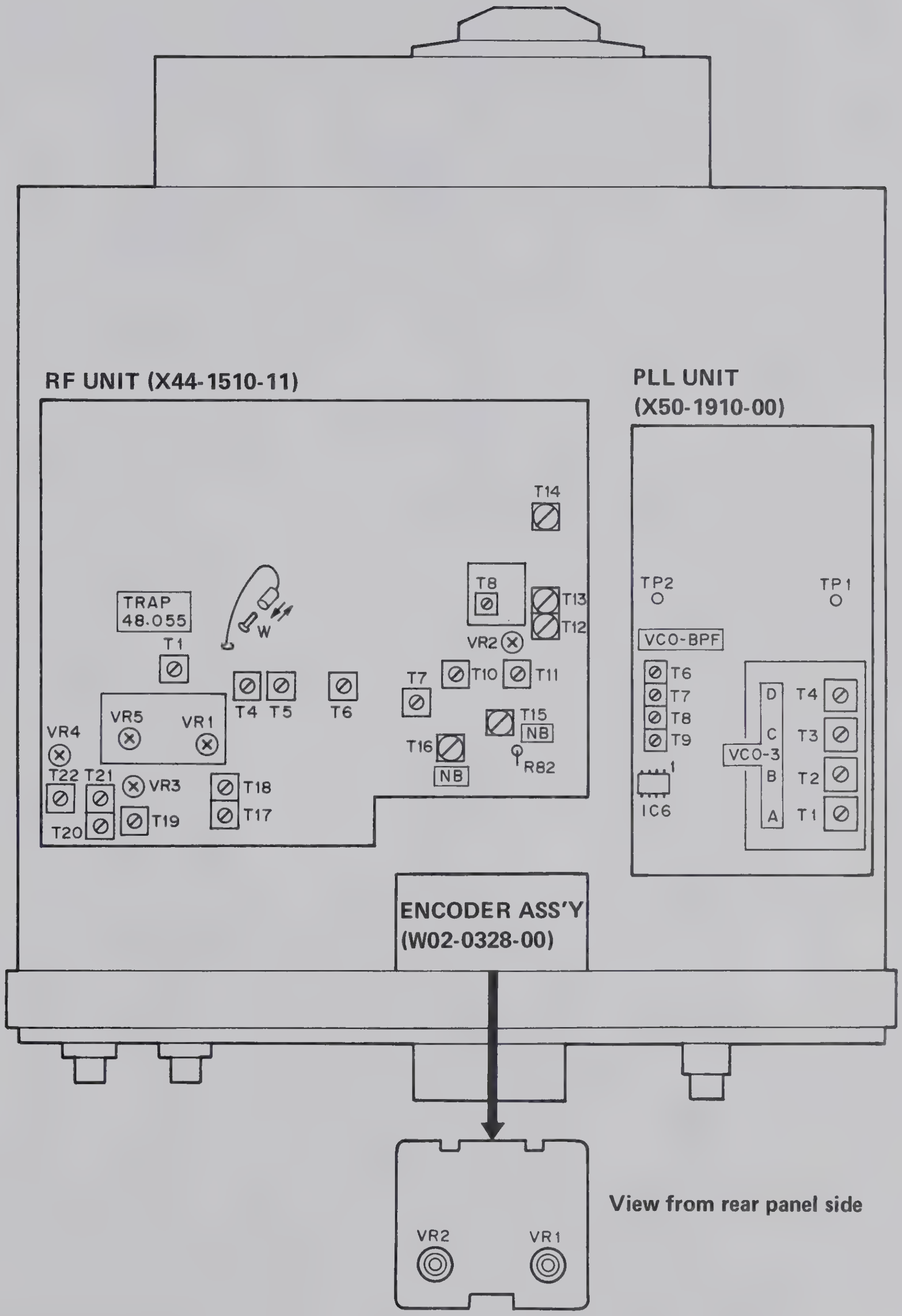
TOP VIEW



T1~3 : 42.805MHz BPF
T4~6 : 33.975MHz BPF
T7~9 : 42.8MHz BPF

ADJUSTMENT

BOTTOM VIEW



View from rear panel side

LEVEL DIAGRAM

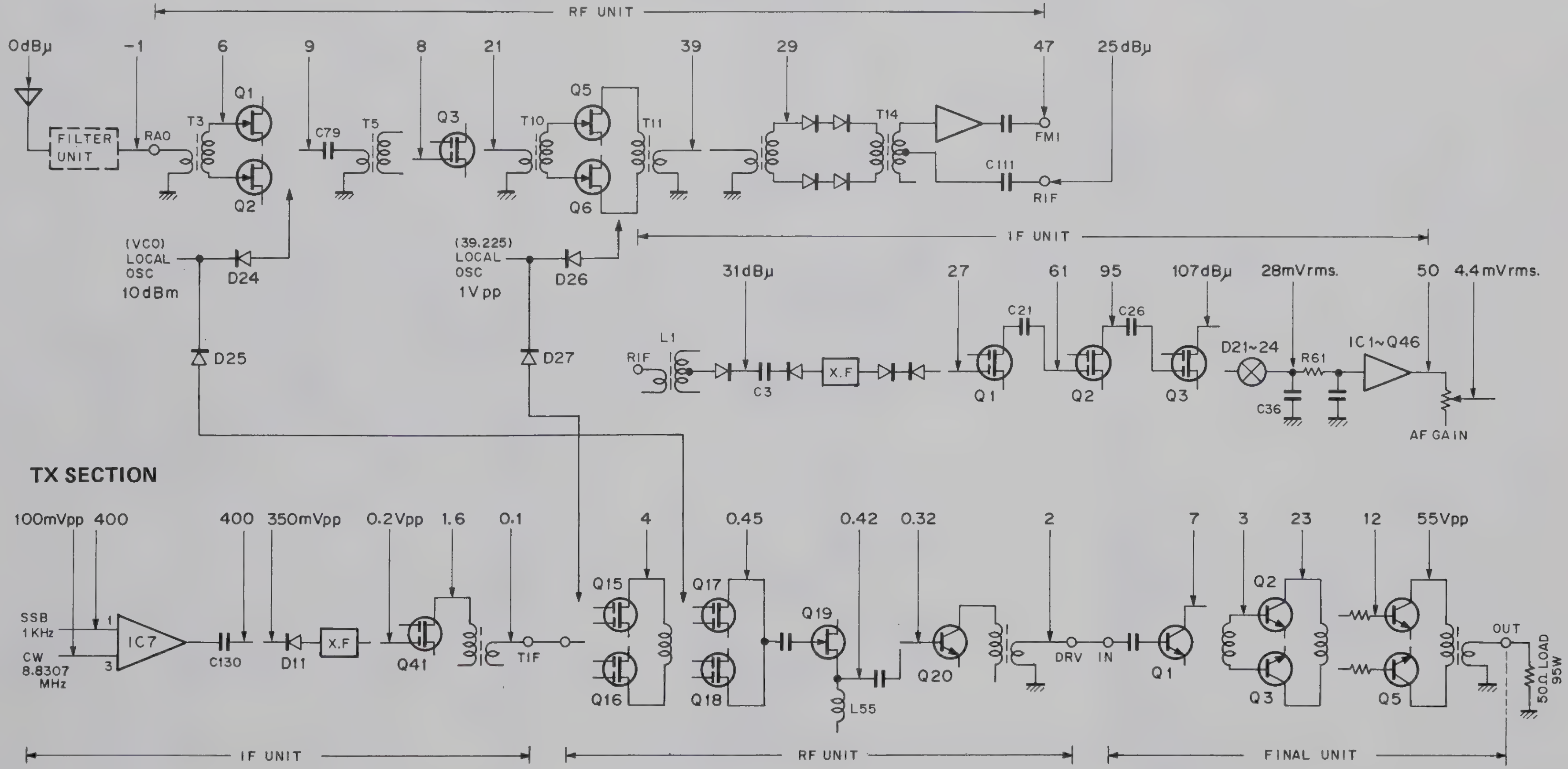
RX SECTION

FREQUENCY : 14.200MHz
INPUT : 0dBμ
AF OUTPUT : 0.63V at 8Ω

NOTES

1) The figures shown are signal generator output required for a constant audio output with a constant AF gain control setting. Set the AF gain control for 0.63V/8Ω (50mW) audio output at 0dB signal generator input at 14.200MHz.

2) To measure signal generator output connect a 0.01μF 500WV capacitor between the signal generator and the check point.



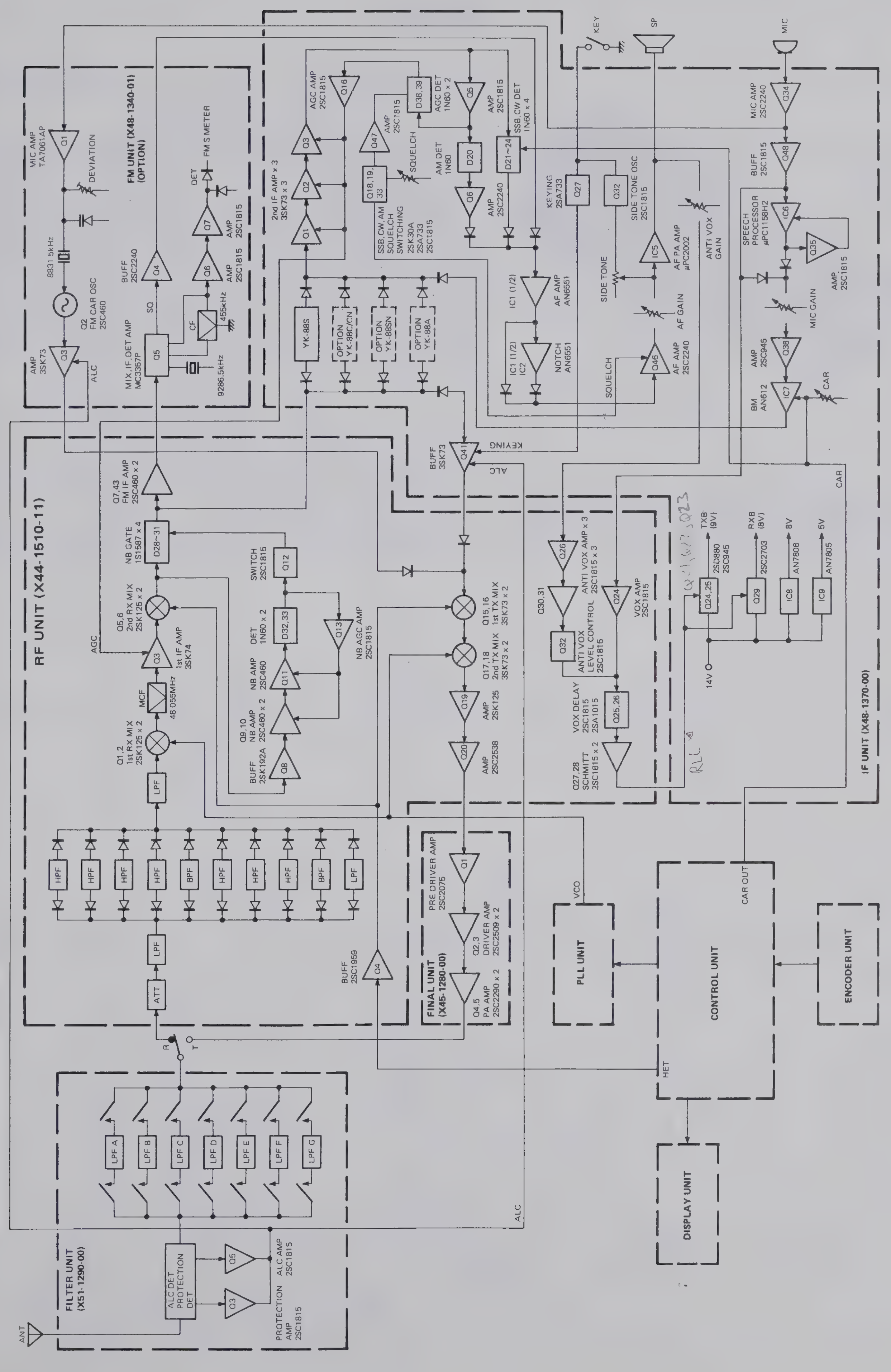
TX SECTION

FREQUENCY : 14.200MHz
AF INPUT
SSB : 1kHz,400mVpp to IC7 1pin.
CW : 8.8307MHz, 100mVpp to IC7 3pin.

NOTES

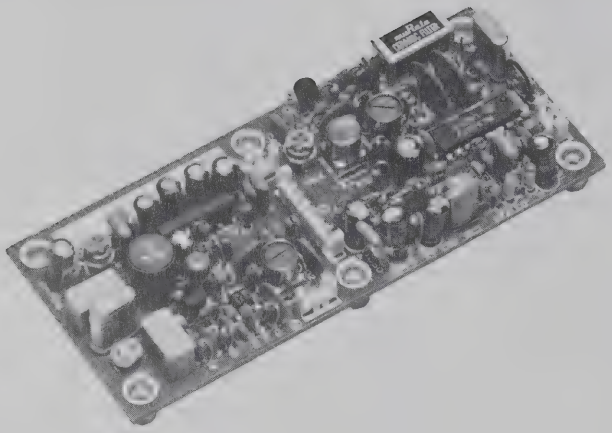
1) Adjust ALC level control for full scale reading.

BLOCK DIAGRAM TS-430S



FM-430

OUTSIDE VIEW



PARTS LIST

SEMICONDUCTOR

N : New parts

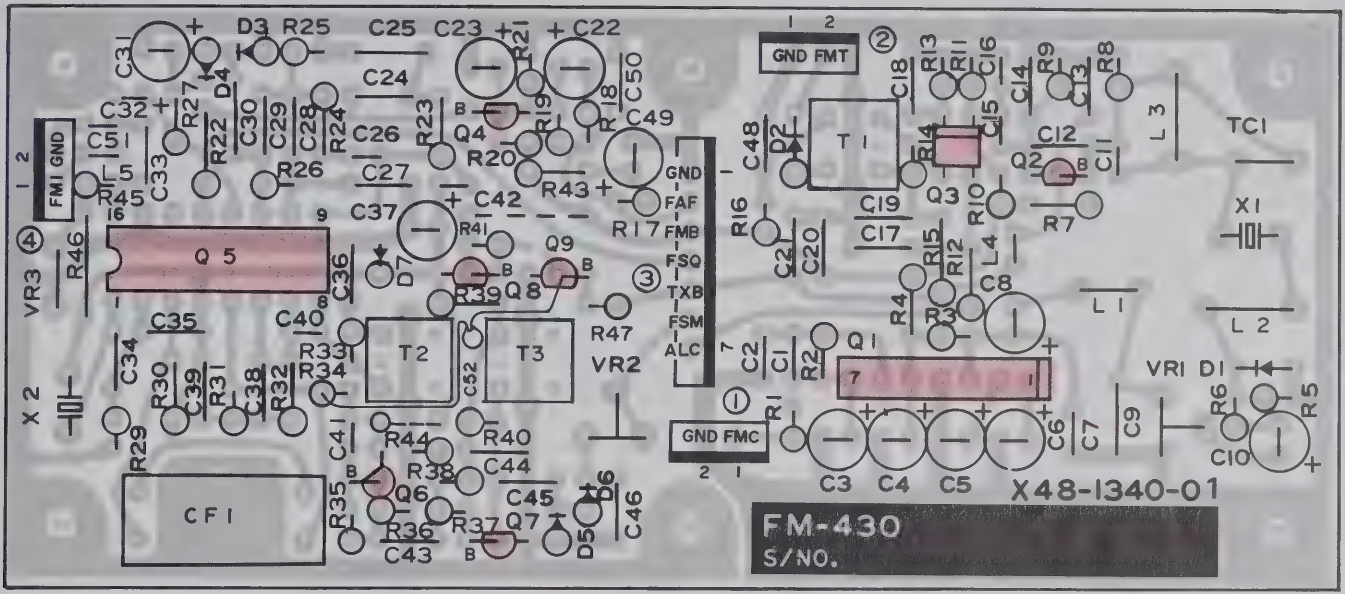
Item	Re-marks	Name	Item	Re-marks	Name
Diode		1N60	**FET**		3SK73(GR)
		1S1555			
		1S2208	**IC**		MC3357P
Zener diode		WZ-071			TA7061AP
TR		2SA1015(Y)			
		2SC460(B)			
		2SC1815(Y)			
		2SC2240(GR)			

Part No.	Re-marks	Description	Ref. No.
		FM-430 GENERAL	
B50-4029-00	N	Instruction manual	
H01-4471-13	N	Packing carton (inside)	
H12-0483-04		Cushion	
H25-0029-04		Protective bag, Screw	
H25-0120-04		Protective bag, Unit	
J61-0401-05		Nylon band x 4	
N87-3012-46		Self tapping screw x 6	
X48-1340-01	N	FM unit	

Part No.	Re-marks	Description	Ref. No.	Q'ty
		FM UNIT (X48-1340-01)		
C05-0031-15		Ceramic trimmer 10P	TC1	1
CC45SL1H050C		C 5P	C15	1
CC45SL1H101J		C 100P	C29	1
CC45SL1H120J		C 12P	C40	1
CC45SL1H121J		C 120P	C34	1
CC45SL1H150J		C 15P	C51	1
CC45SL1H220J		C 22P	C16,41	2
CC45SL1H221J		C 220P	C12,14	2
CC45SL1H560J		C 56P	C35	1
CC45SL1H680J		C 68P	C27,28	2
CC45UJ1H070D		C 7P	C11	1
CE04W1A101M		E 100 10V	C37	1
CE04W1A220M		E 22 10V	C4,23	2
CE04W1A470M		E 47 10V	C3,6	2
CE04W1E4R7M		E 4.7 25V	C49	1
CE04W1H010M		E 1 50V	C5,8,10,22,31	5
CK45B1H102K		C 0.001	C26,45	2
CK45B1H152K		C 0.0015	C42	1
CK45F1H103Z		C 0.01	C13,17,20,21,33, 36,43,46	8
CK45F1H223Z		C 0.022	C18,19,44,48	4
CK45F1H473Z		C 0.047	C38,39	2
CQ92M1H103K		ML 0.01	C2,7,24	3
CQ92M1H333K		ML 0.033	C50	1
CQ92M1H393K		ML 0.039	C9	1
CQ92M1H472K		ML 0.0047	C1	1
CQ92M1H473K		ML 0.047	C25,30	2
CS15E1C2R2M		T 2.2 16V	C32	1
E40-0273-05		Mini connector 2P		3
E40-0773-05		Mini connector 7P		1
J31-0502-04		PC board collar		6
J42-0428-05		PC board bushing		6
L30-0199-06		Tuning coil	T3	1
L30-0503-05		Tuning coil	T2	1
L34-0535-05		Tuning coil	T1	1
L33-0639-05		Choke coil 10μH	L3	1
L33-0640-05		Choke coil 12μH	L2	1
L40-1511-03		Ferri-inductor 150μH	L4	1
L40-1541-27		Ferri-inductor 150mH	L1	1
L40-6891-01		Ferri-inductor 6.8μH	L5	1
C72-0309-06		Ceramic filter CFT455F2	CF1	1
C77-0939-05		Crystal 9.2865MHz	X2	1
C77-0940-05		Crystal 8.8315MHz	X1	1
R12-3430-05		Trim. pot. 10kΩ(B)	VR1	1
R12-4408-05		Trim. pot. 50kΩ(B)	VR2	1
R12-4410-05		Trim. pot. 50kΩ	VR3	1
R92-0150-05		Short jumper		2

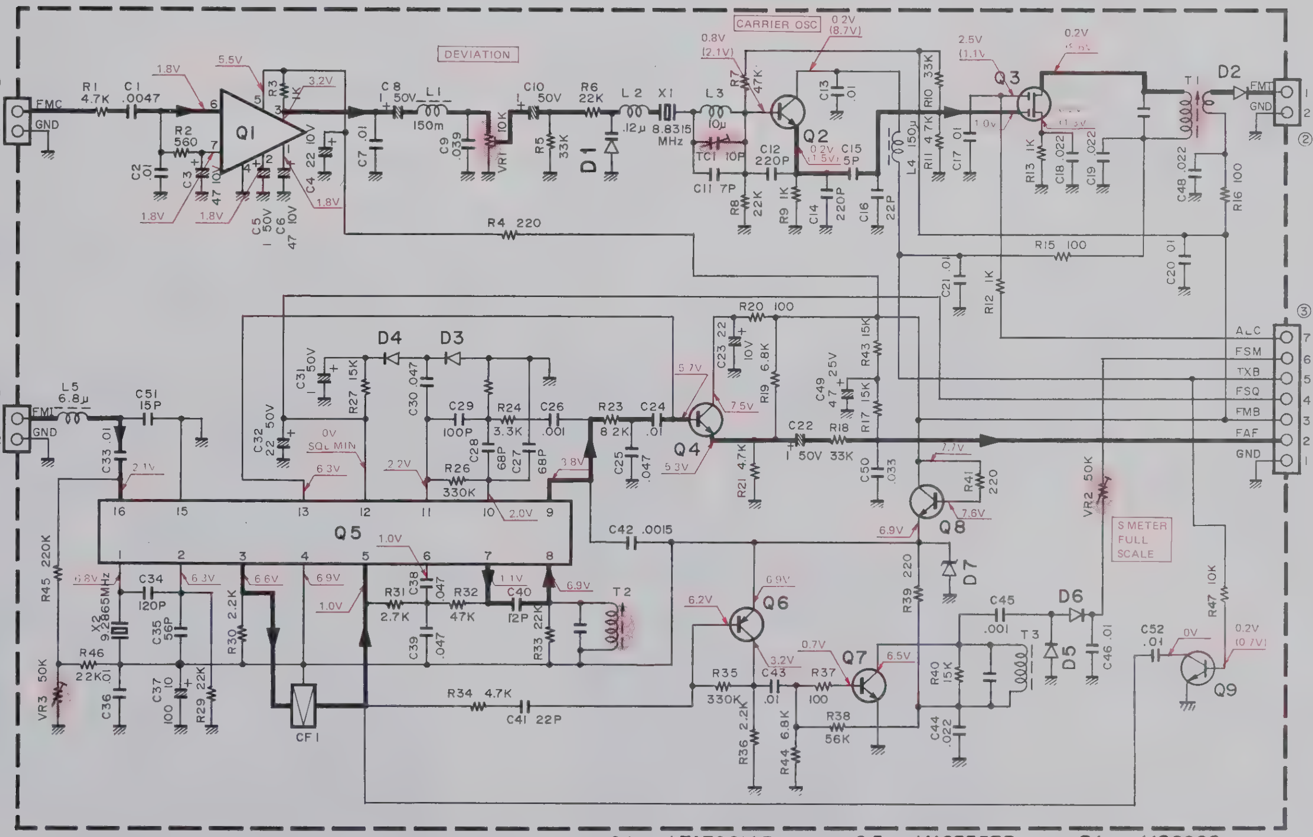
FM-430

PC BOARD VIEW

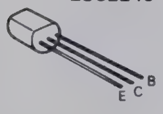


SCHEMATIC DIAGRAM

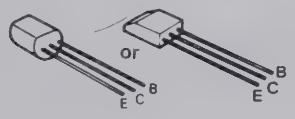
FM UNIT(X48-1340-01)



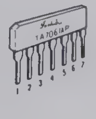
2SA1015 2SC1815
2SC2240



2SC460



TC7061AP



Q1 : TA7061AP
Q2 : 2SC460(B)
Q3 : 3SK73(GR)
Q4 : 2SC2240(GR)

Q5 : MC3357P
Q6 : 2SA1015(Y)
Q7～9: 2SC1815(Y)

D1 : 1S2208
D2 : 1S1555
D3～6: IN60
D7 : WZ071

PS-430

SPECIFICATIONS

Input voltage:	120/220/240V AC±10%, 50/60 Hz
Output voltage:	13.8V DC (standard voltage)
Output current:	20 A (25% duty cycle) 15A (50% duty cycle)
Continuous load current:	10 A max. (including external output terminal)
Output voltage fluctuation:	Within ±0.7 V at AC 120V, 220V, 240V±10% (Load current: 15A) Within 0.7 V between 2–15 A load. (No-load output voltage: Less than 16V at 120V/220/240V. AC)
Ripple voltage.	Less than 20 mV (rms) at 13.8V, output current 15A.
Power consumption:	Approx. 480 W (at 120/220/240V AC. 13.8V DC, 20A)
Dimensions:	173 (6-13/16) W x 95 (3-3/4)H x 245 (9-5/8) D mm (inch)
Weight:	Approx. 7 kg (15.4 lbs.)

PARTS LIST

SEMICONDUCTOR

N : New parts

Item	Remarks	Name	Item	Remarks	Name
Diode		1S1555	**Thermistor**		32D27
		S25VB10			SDT1000(F)
		U05B	**TR**		2N5885
					2SA562(Y)
Zener diode		RD9.1EB2			2SB512(P)
LED		SLP144B			2SC1815(Y)

PS-430 GENERAL

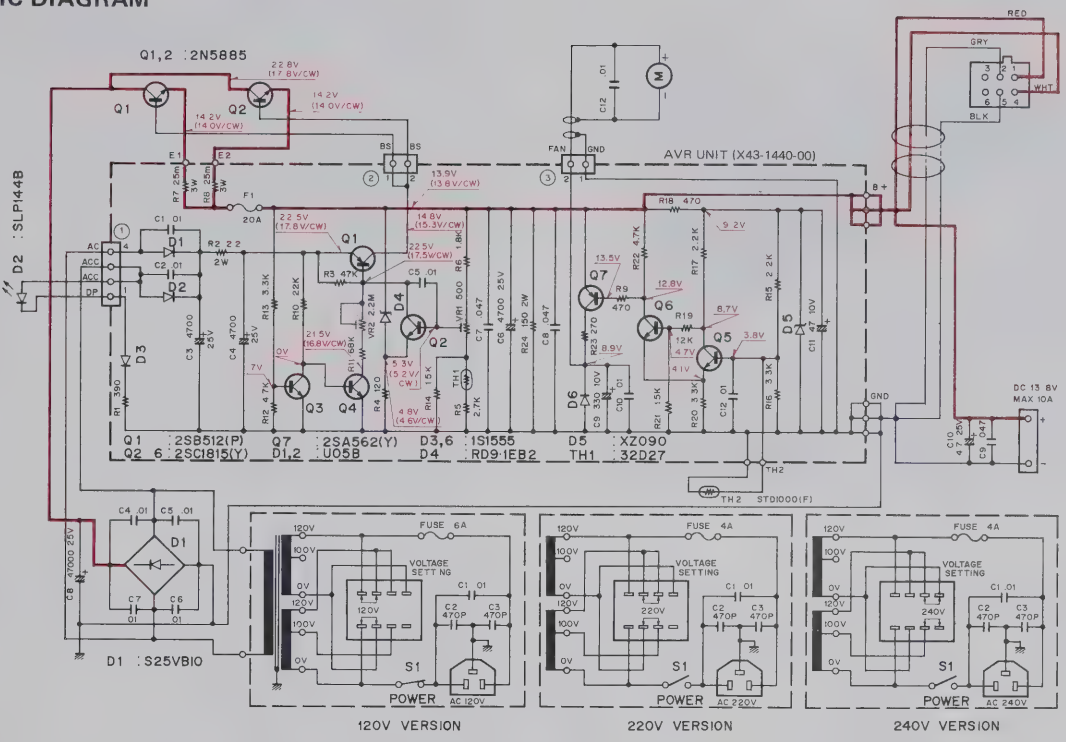
Part No.	Remarks	Description	Ref. No.
A01-0937-02	N	Case (upper)	
A01-0938-12	N	Case (lower)	
A20-2461-13	N	Panel **K,M,W,X**	
A20-2462-03	N	Panel **T**	
B39-0407-04		Spacer x 2	
B40-2634-04	N	Name plate	
B41-0626-14	N	Voltage sheet 120V **K**	
B41-0627-14	N	Voltage sheet 220V **M,W**	
B41-0630-04	N	Voltage sheet 240V **T,X**	
B42-1733-14		Voltage sheet	
B42-1770-04	N	Current indication sheet **M,T,W,X**	
B46-0404-00		Warranty card **K**	
B50-4014-10	N	Instruction manual **K,M,W,X**	
B50-4015-00	N	Instruction manual **T**	
CE04W1E4R7M		E 4.7 25V	C10
CK45E2H103P		C 0.01 500V x 4	C4–7
CK45F1H473Z		C 0.047 x 2	C9,11
C90-0865-05	N	E 47000 25V	C8
C91-0079-05		C 0.01	C1
C91-0496-05		C 470P x 2	C2,3
E18-0351-05		3P Inlet	
E20-0282-05		2P terminal plate	
E22-0472-05		Lug plate	
E23-0015-04		GND lug	
E23-0425-05		Lug terminal	
E30-1643-15		AC cord **K,M**	
E30-1644-15		AC cord **T**	
E30-1645-05		AC cord **W**	
E30-1647-05		AC cord **X**	
E31-0500-05		Cable with plug	
F01-0786-03	N	Heat sink plate	
F01-0787-13	N	Heat sink	
F05-4022-05		Fuse 4A **K**	
F05-4022-05		Fuse 4A x 2 **M,T,W,X**	
F05-6021-05		Fuse 6A x 2 **K**	
F05-6021-05		Fuse 6A **M,T,W,X**	
F07-0847-04	N	Fan cover	
F09-0405-24		Fan	
H01-4451-14	N	Packing carton (inside) **K,M,W,X**	
H01-4452-04	N	Packing carton (inside) **T**	
H10-2567-02	N	Packing fixture (F)	
H10-2568-02	N	Packing fixture (R)	
H12-1319-04	N	Cushion	
H20-1420-03		Protective cover	
H25-0105-04		Protective bag	
J02-0323-05		Foot x 2	
J02-0427-04	N	Assistant foot	
J13-0033-15		Fuse holder	
J42-0403-05		Cord bushing	
J42-0095-05	N	Rubber bushing x 3	
K29-0758-04		Push knob	
L01-8166-25	N	Power transf.	
S29-2406-05		Voltage selector switch	S2
S40-1405-05	N	Power switch	S1
T42-0301-05		Fan motor	
X43-1440-00	N	AVR unit	

AVR UNIT (X43-1440-00)

Part No.	Remarks	Description	Ref. No.	Q'ty
CE04W1A331M		E 330 10V	C9	1
CE04W1A470M		E 47 10V	C11	1
CK45F1H103Z		C 0.01	C1,2,5	3
CK45F1H473Z		C 0.047	C7,8	2
C90-0814-05		E 4700 25V	C3,4,6	3
E23-0022-04		Terminal		8
E23-0046-04		Square terminal		2
E40-0273-05		Mini connector 2P		2
E40-0473-05		Mini connector 4P		1
F05-2035-15		Fuse 20A		1
J31-0502-04		PC board collar		4
J42-0428-05		PC board bushing		4
R12-0427-05		Trim. pot. 500Ω (B)	VR1	1
R12-8404-05		Trim. pot. 2.2M Ω (B)	VR2	1
RS14GB3D2R2J		MF 2.2Ω 2W	R2	1
R92-0663-05	N	Cement 0.025Ω 3W	R7,8	2

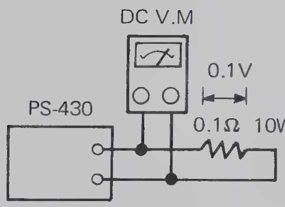
PS-430

SCHEMATIC DIAGRAM



ADJUSTMENT

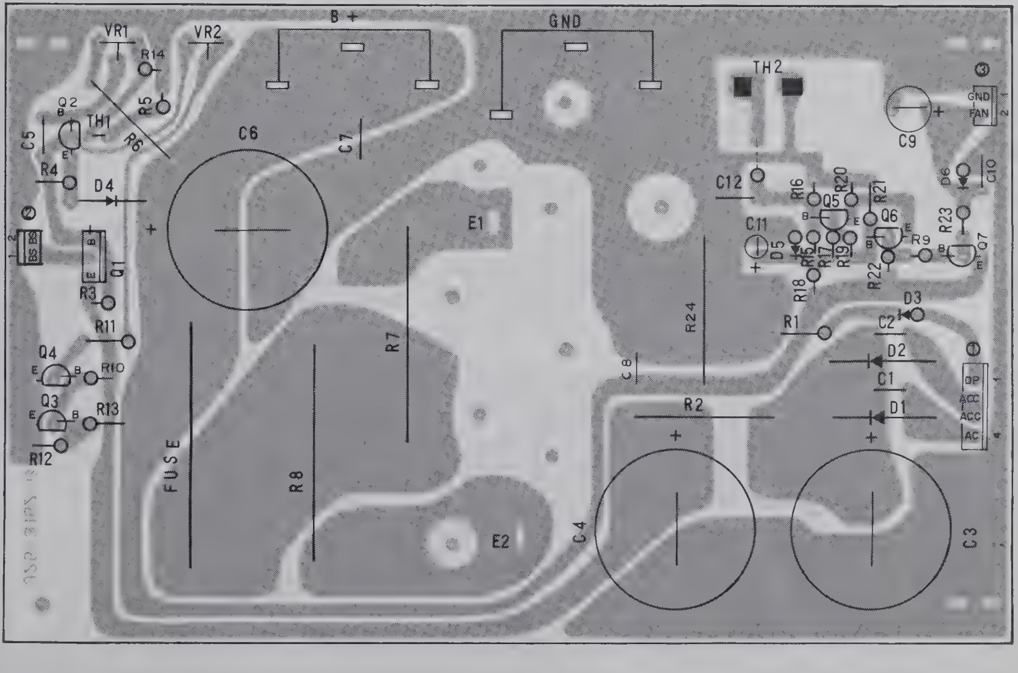
1. Connect the load and set the current to 15A.
2. Adjust output voltage to 13.8V ± 0.4V with VR1.
3. Protection circuit



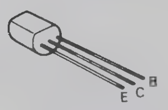
Connect a 0.1Ω 10W resistor and adjust VR2 so that 0.1V DC is obtained.

PC BOARD VIEW

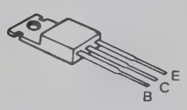
AVR UNIT (X43-1440-00) Component side view



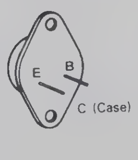
2SC1815



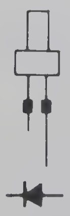
2SB512



2N5885

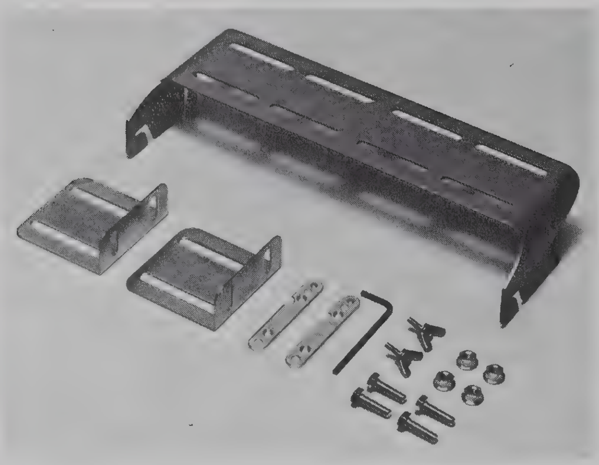


SLP-144B



MB-430/SP-430

MB-430 OUTSIDE VIEW



SP-430 SPECIFICATIONS

SPEAKER SIZE	3"
RATED INPUT	1.0 watts
IMPEDANCE	8 ohms
FREQUENCY RESPONSE	300 Hz to 5 kHz
DIMENSIONS	4-7/8" wide x 3-3/4" high x 9-1/3" deep (excluding feet)
WEIGHT	3.1 lbs.

SP-430 PARTS LIST

N : New parts

Part No.	Re-marks	Description	Ref. No.
A01-0942-03	N	Case (B)	
A01-0944-13	N	Case (A)	
A20-2468-03	N	Panel **K,M**	
A20-2469-03	N	Panel **T**	
A23-1431-04		Rear panel	
B04-0406-04	N	SP grill	
B07-0613-14		SP ring	
B39-0407-04		Spacer x 2	
B46-0404-00		Warranty card **K**	
B50-4026-10	N	Instruction manual **K,M**	
B50-4027-00	N	Instruction manual **T**	
E20-0208-04		Terminal plate	
E30-1629-15		SP cord	
G53-0507-04		Packing x 4	
H01-4468-14	N	Packing carton **K,M**	
H01-4469-04	N	Packing carton **T**	
H10-2513-02		Packing fixture (F)	
H10-2514-12		Packing fixture (R)	
H12-0445-04		Cushion	
H20-1407-03		Protective cover	
H25-0077-03		Protective bag Accessory	
J02-0323-05		Foot x 4	
J02-0409-04		Assistant foot	
J21-1144-14		SP mounting hardware x 2	
J21-2573-04		Foot mounting hardware x 2	
J61-0019-05		Vinyle tie	
N15-1030-46		Washer x 8	
N30-3008-46		Round screw x 4	
N35-3006-41		Bind screw x 12 Case	
N87-3006-46		Self tapping screw x 6	
N87-3008-46		Self tapping screw x 4	
T07-0224-05	N	Speaker	

MB-430 PARTS LIST

N : New parts

Part No.	Re-marks	Description	Ref. No.
A13-0635-03	N	Angle	
B50-4016-00	N	Instruction manual	
H01-4453-13	N	Packing control (inside) **M**	
H01-4454-13	N	Packing control (inside) **T**	
H25-0077-04		Protective bag	
H25-0098-04		Protective bag 150 x 480	
J30-0521-04	N	Spacer x 2	
N09-0007-05		Wing bolt x 5	
N09-0008-04		Hex. screw x 6	
N14-0009-04		Nut x 6	
N15-1060-46		Flat washer x 6	
N16-0060-46		Spring washer x 6	
N32-3006-46		Flat screw x 4	
N99-0309-04	N	Hex. head screw x 6	
W01-0401-04		Hex. wrench	

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Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

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Rembrücker Str. 15, 6056 Heusenstamm, West Germany

TRIO-KENWOOD ELECTRONICS, N.V.
Leuvensesteenweg 504, B-1930 Zaventem Belgium

TRIO-KENWOOD (AUSTRALIA) PTY. LTD. (INCORPORATED IN N.S.W.)
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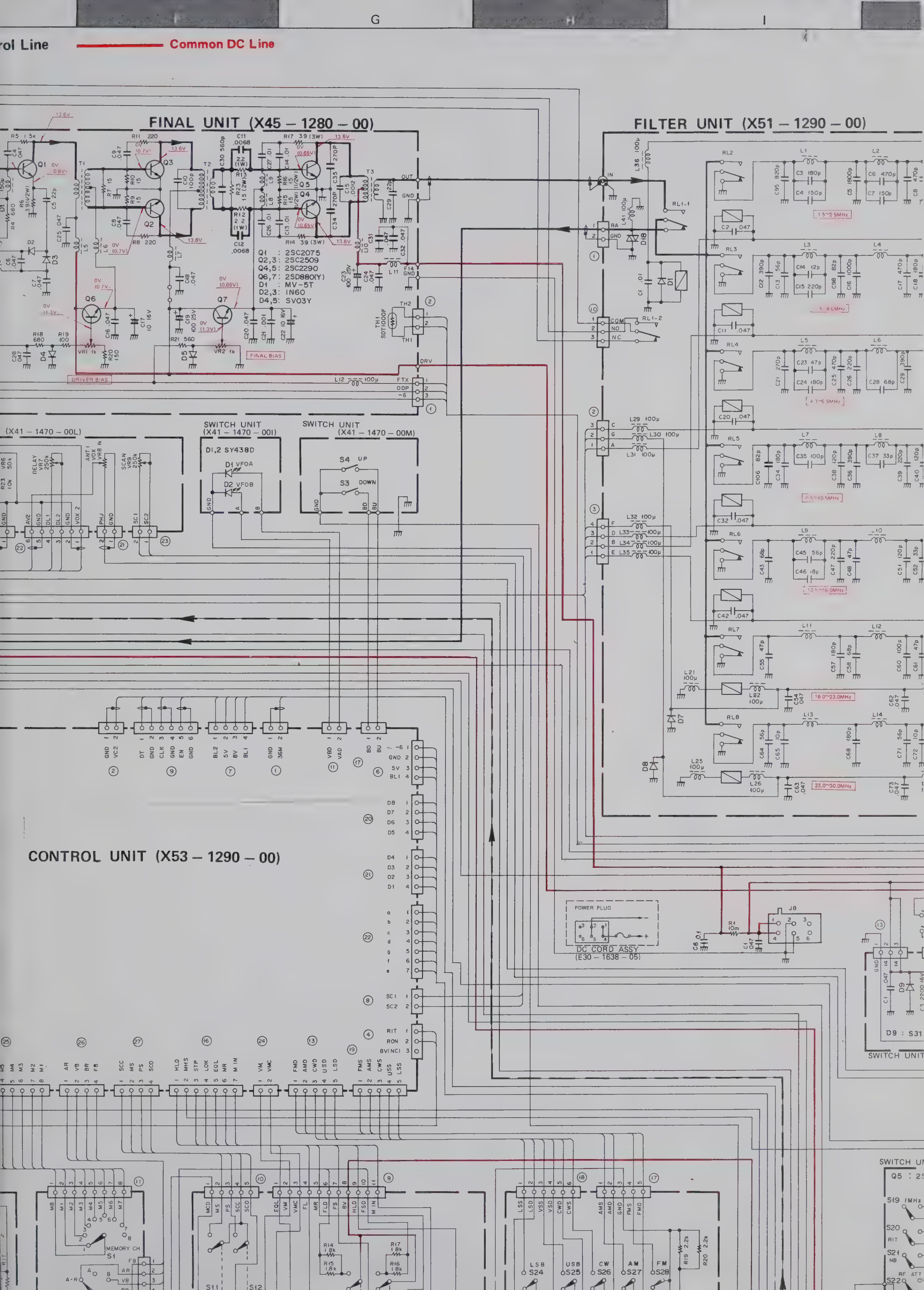
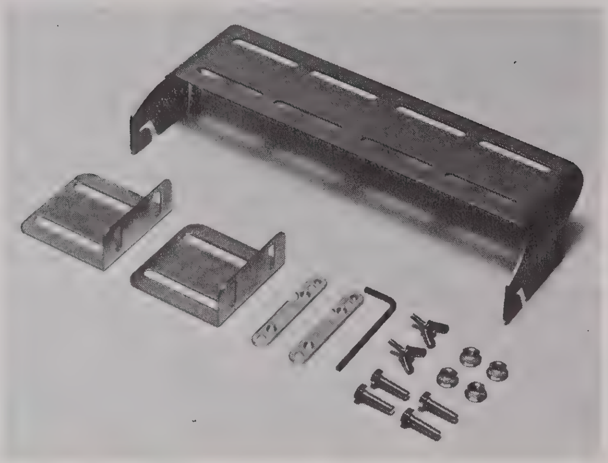

G
I
rol Line
Common DC Line
FINAL UNIT (X45 – 1280 – 00)
FILTER UNIT (X51 – 1290 – 00)
Q1 : 2SC2075
Q2,3 : 2SC2509
Q4,5 : 2SC2290
Q6,7 : 2SD880(Y)
D1 : MV-5T
D2,3 : 1N60
D4,5 : SV03Y
DRIVER BIAS
FINAL BIAS
TH1 SDT1000F
OUT
GND
DRV
FTX
ODP
IN
RL1-1
RL1-2
COM
NO
NC
1.5~2.5MHz
3~4.0MHz
4.1~6.5MHz
6.5~10.5MHz
10.5~16.0MHz
16.0~23.0MHz
23.0~30.0MHz
(X41 – 1470 – 00L)
SWITCH UNIT (X41 – 1470 – 00I)
D1,2 SY438D
D1 VFOA
D2 VFOB
SWITCH UNIT (X41 – 1470 – 00M)
S4 UP
S3 DOWN
CONTROL UNIT (X53 – 1290 – 00)
POWER PLUG
DC CORD ASSY (E30 – 1638 – 05)
J8
D9 : S31
SWITCH UNIT
SWITCH UN
Q5 : 2S
S19 1MHz
S20 RIT
S21 NB
S22 RF ATT
MEMORY CH S1
S11
S12
LSB S24
USB S25
CW S26
AM S27
FM S28
R14 1.8k
R15 1.8k
R16 1.8k
R17 1.8k
R19 2.2k
R20 2.2k

MB-430/SP-430

MB-430 OUTSIDE VIEW



SP-430 SPECIFICATIONS

SPEAKER SIZE	3"
RATED INPUT	1.0 watts
IMPEDANCE	8 ohms
FREQUENCY RESPONSE	300 Hz to 5 kHz
DIMENSIONS	4-7/8" wide x 3-3/4" high x 9-1/3" deep (excluding feet)
WEIGHT	3.1 lbs.

SP-430 PARTS LIST

N : New parts

Part No.	Re-marks	Description	Ref. No.
A01-0942-03	N	Case (B)	
A01-0944-13	N	Case (A)	
A20-2468-03	N	Panel K,M	
A20-2469-03	N	Panel T	
A23-1431-04		Rear panel	
B04-0406-04	N	SP grill	
B07-0613-14		SP ring	
B39-0407-04		Spacer x 2	
B46-0404-00		Warranty card K	
B50-4026-10	N	Instruction manual K,M	
B50-4027-00	N	Instruction manual T	

MB-430 PARTS LIST

N : New parts

Part No.	Re-marks	Description	Ref. No.
A13-0635-03	N	Angle	
B50-4016-00	N	Instruction manual	
H01-4453-13	N	Packing control (inside) M	
H01-4454-13	N	Packing control (inside) T	
H25-0077-04		Protective bag	
H25-0098-04		Protective bag 150 x 480	
J30-0521-04	N	Spacer x 2	
N09-0007-05		Wing bolt x 5	
N09-0008-04		Hex. screw x 6	
N14-0009-04		Nut x 6	
N15-1060-46		Flat washer x 6	
N16-0060-46		Spring washer x 6	
N32-3006-46		Flat screw x 4	
N99-0309-04	N	Hex. head screw x 6	
W01-0401-04		Hex. wrench	

Part No.	Re-marks	Description	Ref. No.
E20-0208-04		Terminal plate	
E30-1629-15		SP cord	
G53-0507-04		Packing x 4	
H01-4468-14	N	Packing carton K,M	
H01-4469-04	N	Packing carton T	
H10-2513-02		Packing fixture (F)	
H10-2514-12		Packing fixture (R)	
H12-0445-04		Cushion	
H20-1407-03		Protective cover	
H25-0077-03		Protective bag Accessory	
J02-0323-05		Foot x 4	
J02-0409-04		Assistant foot	
J21-1144-14		SP mounting hardware x 2	
J21-2573-04		Foot mounting hardware x 2	
J61-0019-05		Vinyle tie	
N15-1030-46		Washer x 8	
N30-3008-46		Round screw x 4	
N35-3006-41		Bind screw x 12 Case	
N87-3006-46		Self tapping screw x 6	
N87-3008-46		Self tapping screw x 4	
T07-0224-05	N	Speaker	

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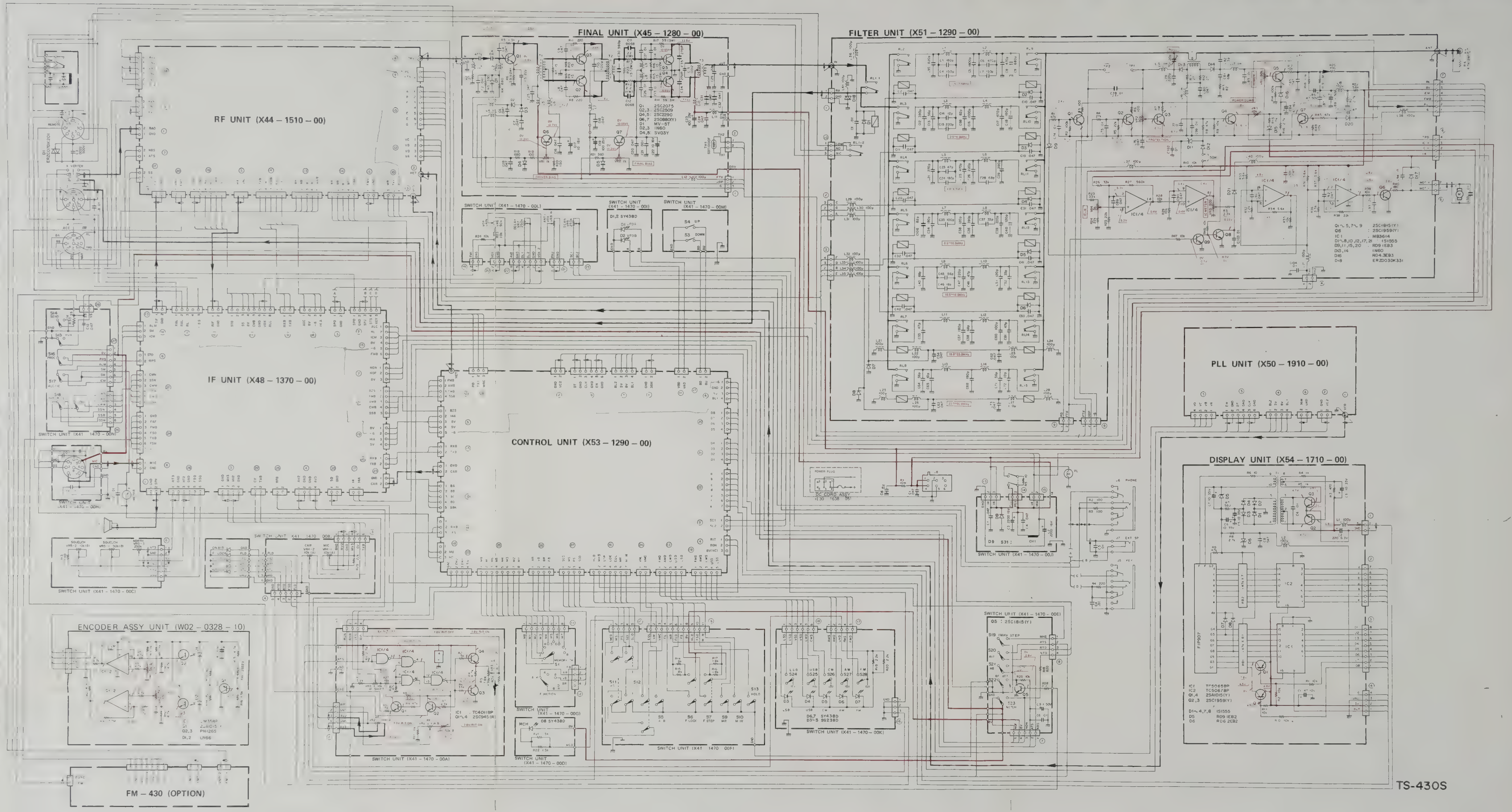
TS-430S SCHEMATIC DIAGRAM

Signal Line
Control Line
Common DC Line

The voltages measured when receiving 14.175MHz, USB. ( ) : in TX.


FINAL UNIT (X45 – 1280 – 00)
FILTER UNIT (X51 – 1290 – 00)
RF UNIT (X44 – 1510 – 00)
IF UNIT (X48 – 1370 – 00)
CONTROL UNIT (X53 – 1290 – 00)
PLL UNIT (X50 – 1910 – 00)
DISPLAY UNIT (X54 – 1710 – 00)
ENCODER ASSY UNIT (W02 – 0328 – 10)
FM – 430 (OPTION)
SWITCH UNIT (X41 – 1470 – 00L)
SWITCH UNIT (X41 – 1470 – 00I)
SWITCH UNIT (X41 – 1470 – 00M)
SWITCH UNIT (X41 – 1470 – 00N)
SWITCH UNIT (X41 – 1470 – 00H)
SWITCH UNIT (X41 – 1470 – 00C)
SWITCH UNIT (X41 – 1470 – 00B)
SWITCH UNIT (X41 – 1470 – 00J)
SWITCH UNIT (X41 – 1470 – 00E)
SWITCH UNIT (X41 – 1470 – 00A)
SWITCH UNIT (X41 – 1470 – 00G)
SWITCH UNIT (X41 – 1470 – 00D)
SWITCH UNIT (X41 – 1470 – 00F)
SWITCH UNIT (X41 – 1470 – 00K)
DC CORD ASSY
POWER PLUG

TS-430S

Connector No.	Terminal No.	Terminal name	Terminal Function
RF UNIT (X44-1510-11)			
①	1	RAO	RX ANT input
	2	GND	Ground
②	inside	HET	39.225MHz input
	outside	GND	G
③	inside	VCO	VCO input
	outside	GND	G
④	1	-6	–6V
	2	AGC	AGC input
	3	RXB	RX 9V
	4	14	+14V
	5	TXB	TX 9V
⑤	1	RIF	RX IF 8.83MHz (except FM)
	2	GND	G
⑥	1	FMI	RX IF (FM) 8.83MHz
	2	GND	G
⑦	1	ATS	Attenuator switch
	2	NBS	Noise blanker switch
⑧	inside	DRV	Driver output
	outside	GND	G
⑨	1	PD	Power down signal output
	2	FTX	TXB for filter
⑩	1	WRC	WARC band signal
	2	TXI	TX inhibit
	3	PD	Power down signal input
⑪	1	XVO	X VERTER output
	2	GND	G
	3	XVS	X VERTER select

Connector No.	Terminal No.	Terminal Name	Terminal Function	
⑫	1	VC	VCO power supply 16–23MHz	
	2	VB	VCO power supply 7.5–16MHz	
	3	VD	VCO power supply 23–30MHz	
	4	VA	VCO power supply 0–7.5MHz	
⑬	1	BA	Band data BCD	0 0–0.5MHz
	2	BB		1 0.5–1.6MHz
	3	BC		2 1.6–2.5MHz
	4	BD		3 2.5–4MHz
	5	WAR	WARC band signal	4 4–6.5MHz
⑭	1	BA	Band data BCD	5 6.5–7.5MHz
	2	BB		6 7.5–10.5MHz
	3	BC		7 10.5–16MHz
	4	BD		8 16–23MHz
	5	SBK	Signal blanking	9 23–30MHz
⑮	1	A	0–2.5MHz	Filter unit relay power supply
	2	B	2.5–4MHz	
	3	F	16–23MHz	
	4	D	7.5–10.5MHz	
	5	C	4–7.5MHz	
	6	E	10.5–16MHz	
	7	G	23–30MHz	
⑯	1	SS	SEND switch	
	2	CWB	Power supply for CW	
	3	RLC	Relay drive circuit control	
	4	8V	8V AVR	
	5	GND	G	
	6	STO	Side tone output	
⑰	1	VS	VOX switch	
	2	SS	SEND switch	

Connector No.	Terminal No.	Terminal name	Terminal Function
⑱	1	DL2	VOX DELAY time terminal 2
	2	DL1	control Pot terminal 1
	3	GND	G
	4	VX2	VOX GAIN Pot. terminal 2
	5	GND	G
	6	AV2	ANTI VOX Pot terminal 2
⑲	1	TIF	TX IF 8.83MHz (except FM)
	2	GND	G
⑳	1	GND	G
	2	FMT	TX IF (FM) 8.83MHz
FINAL UNIT (X45-1280-00)			
①	1	TXB	TX +B
	2	ODP	Over drive protection output signal
	3	–6	–6V
②	1	TH2	Heat sink Thermistor
	2	TH1	Heat sink
		DRV	13.8V for pre-drive and drive TR
	inside	IN	Input signal from RF unit
	outside	GND	G
	inside	OUT	Final signal output
	outside	GND	G
	Red	F14	13.8V for final TR
	Black	GND	G
IF UNIT (X48-1370-00)			
①	1	SPK	Internal SP output
	2	GND	G

Connector No.	Terminal No.	Terminal name	Terminal Function
②	1	SPO	Output for Speaker
	2	GND	G
	3	SPJ	Input from EXT.SP jack
	4	STS	Side tone switch
	5	KEY	KEY line for CW
③	1	SPO	Output for Speaker
	2	GND	G
④	1	AV2	AF GAIN control No.2
	2	GND	G
	3	GND	G
	4	AV3	AF GAIN control No.3
⑤	1	GND	G
	2	MV3	MIC control No.3
	3	MV2	MIC control No.2
	4	GND	G
⑥	1	–	
	2	PRS	Processor switch
⑦	1	NON	Notch ON
	2	NOF	Notch OFF
	3	8	+8V
⑧	1	MIC	MIC input
	2	GND	
⑨	1	RXB	RX 9V output
	2	TXB	TX 9V output
⑩	1	RXB	RX 9V output
	2	TXB	TX 9V output

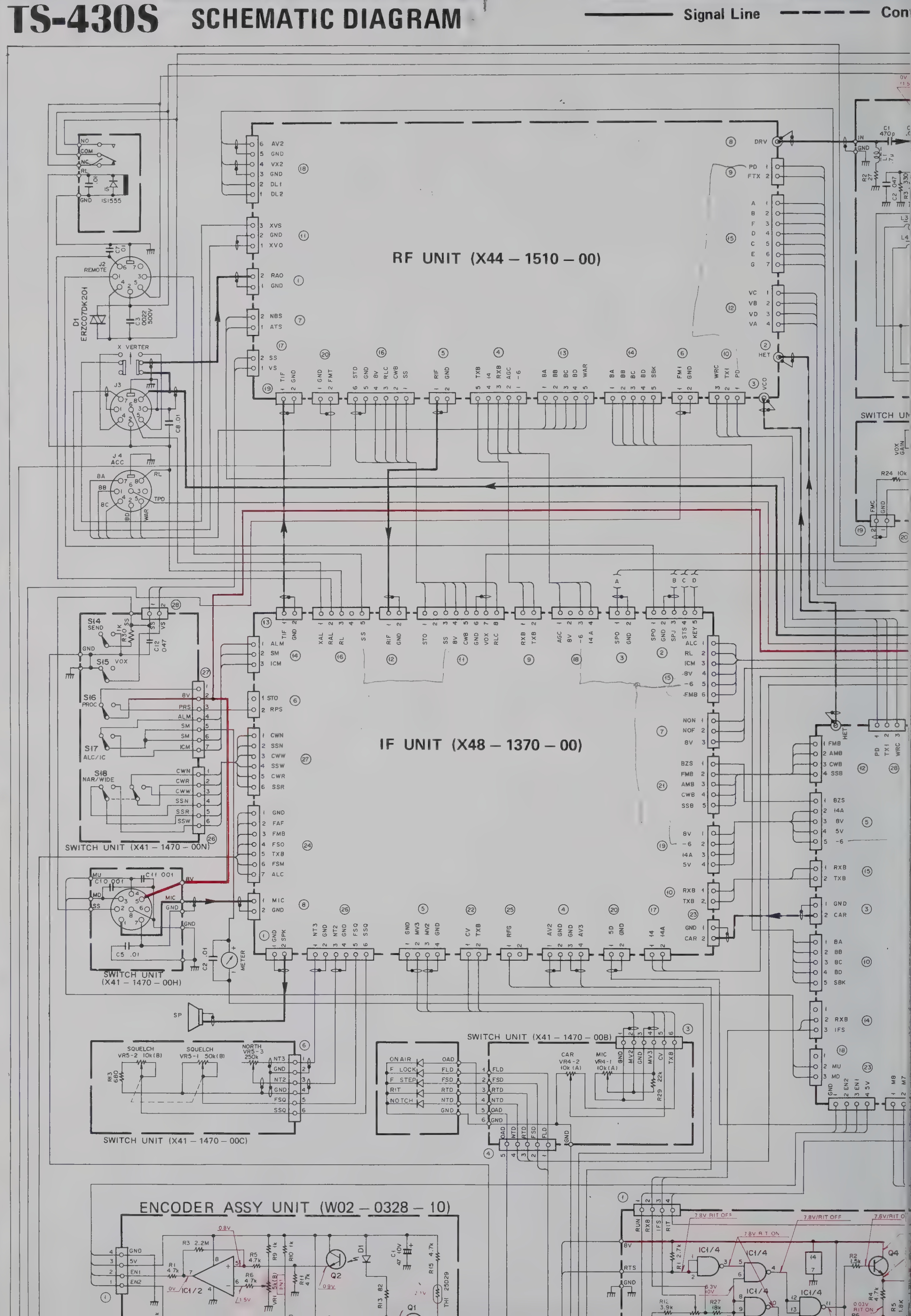
Connector No.	Terminal No.	Terminal name	Terminal Function
⑪	1	STO	VOX side tone output
	2	–	
	3	SS	STBY switch
	4	8	+8V
	5	CWB	CW 9V output
	6	GND	G
	7	VOX	MIC amp. output for VOX amp.
	8	RLC	TX select signal
⑫	1	RIF	RX IF amp. input
	2	GND	G
⑬	1	TIF	TX IF amp. output
	2	GND	
⑭	1	ALM	ALC meter output
	2	SM	S meter output
	3	ICM	IC meter output
⑮	1	ALC	ALC input
	2	RL	TX +B (approx. 12V)
	3	ICM	IC meter output
	4	8	+8V
	5	–6	–6V
	6	FMB	FM +B
⑯	1	XAL	ALC input from X.VERTER
	2	RAL	ALC input from Linear amp.
	3	RL	TX +B (approx. 12V)
	4	–	
	5	SS	STBY switch
⑰	1	14	+13.8V
	2	14A	+13.8V (after choke coil)

Connector No.	Terminal No.	Terminal name	Terminal Function
⑱	1	AGC	AGC line
	2	8	+8V
	3	–6	–6V
	4	14	+13.8V
⑲	1	8	+8V
	2	–6	–6V
	3	14A	+13.8V
	4	5	+5V
⑳	1	5D	+5V output for Control unit
	2	GND	G
㉑	1	BZ	
	2	FMB	FM +B
	3	AMB	AM +B
	4	CWB	CW +B
	5	SSB	SSB +B
㉒	1	CV	CW, AM Carrier injection control
	2	TXB	TX +B
㉓	1	GND	G
	2	CAR	CAR (8.83MHz) input
㉔	1	GND	G
	2	FAF	AF input for FM receive
	3	FMB	FM +B
	4	FSQ	FM squelch
	5	TXB	TX +B
	6	FSM	FM S meter
	7	ALC	FM TX ALC
㉕	1	RFG	RX RF GAIN control
	2	–	

Connector No.	Terminal No.	Terminal name	Terminal Function
㉖	1	NT3	Notch control No.3
	2	GND	G
	3	NT2	Notch control No.2
	4	GND	
	5	FSQ	FM squelch
	6	SSQ	SSB,CW,AM squelch
㉗	1	CWN	CW narrow filter
	2	SSN	SSB narrow filter
	3	CWW	CW wide filter
	4	SSW	SSB wide filter
	5	CWR	CW RX +B
	6	SSR	SSB RX +B
100W FILTER UNIT (X51-1290-00)			
①	1	RA	RX Antenna
	2	GND	G
②	1	A	Band information 1.5–2.5MHz
	2	G	Band information 23–30MHz
	3	C	Band information 4–6.5MHz
③	1	E	Band information 10.5–16MHz
	2	B	Band information 2.5–4MHz
	3	F	Band information 16–23MHz
	4	D	Band information 6.5–10.5MHz
④	1	TH1	Thermistor
	2	TH2	Thermistor
⑤	1	MOT–	Fan motor power supply
	2	MOT+	Fan motor power supply

Connector No.	Terminal No.	Terminal name	Terminal Function
⑥	1	14	14V line
	2	IC–	Resistor terminal for IC meter
	3	IC+	Resistor terminal for IC meter
	4	TPD	Signal input for power down control
⑦	1	–6	–6V
	2	ALC	ALC line
	3	FMB	FM +8V
	4	ICM	IC meter output
	5	8V	+8V
	6	RL	TX +B (approx. 12V)
⑧	1	TXB	TX +B
	2	ODP	Over drive protection signal input
	3	–6	–6V
⑨	1	PD	28MHz power down signal
	2	TXB	TX +B (8.8V)
	inside	IN	Signal input from Final unit
	outside	GND	G
	inside	ANT	Antenna terminal
	outside	GND	G

TS-430S SCHEMATIC DIAGRAM



KENWOOD

SERVICE MANUAL

TS-430S

FM-430, MB-430, SP-430, PS-430

HF TRANSCEIVER

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SPECIFICATIONS

[GENERAL]
Transmitter Frequency Range: 160, 80, 40, 30*, 20, 17*, 15, 12*, 10 meter Amateur bands
Receiver Frequency Range: 150 kHz to 30 MHz
Mode: A3J (LSB, USB), A1 (CW), A3 (AM), F3
Antenna Impedance: 50Ω
Power Requirement: 12.0 to 16.0 V DC (13.8 V nominal)
Power Consumption: 20A approx. in transmit mode
1.2A approx. in receive mode
Dimensions: 270 (10.6)W × 96 (3.8)H × 275 (10.8)D mm (inch)
Weight: 6.5 kg (14.3 lbs.)

[TRANSMITTER]
Final Power Input:

Mode Band	SSB	CW	FM	AM
160m – 15m band	250WPEP	200WDC	–	60W
10m band	250WPEP	200WDC	120W	60W

Modulation: SSB = Balanced Modulation
FM = Variable Reactance Direct Shift
(with FM-430 optional accessory)
AM = Low Level Modulation (IF stage)
Carrier Supression: Better than 40 dB
Unwanted Sideband Suppression: Better than 50 dB
Harmonic Content: Less than –40 dB
Maximum Frequency Diviation (FM): ±5 kHz (with FM-430 optional accessory)
Microphone Impedance: 500Ω to 50 kΩ

[RECEIVER]
Circuitry: SSB, CW, AM = Double conversion Superheterodyne
FM = Triple Conversion Superheterodyne
Intermediate Frequency: 1st IF = 48.055 MHz
2nd IF = 8.83 MHz
3rd IF = 455 kHz (only FM)
Sensitivity:

Frequency Mode	150kHz – 500kHz	500kHz – 1.8MHz	1.8MHz – 30MHz
SSB/CW(10 dB S/N)	Less than 1 μV	Less than 4 μV	Less than 0.25 μV
AM(10 dB S/N)	Less than 13 μV	Less than 40 μV	Less than 2.5 μV
FM (30 dB S/N)	–	–	*Less than 1 μV
FM (12 dB SINAD)	–	–	*Less than 0.4 μV

* with FM-430 optional accessory

Image Ratio: More than 70 dB (1.8 to 30 MHz)
More than 50 dB (FM-3rd image ratio)
IF Rejection: More than 70 dB (1.8 to 30 MHz)
Selectivity:

Selectivity Mode	–6 dB	–60 dB
SSB/CW	2.4 kHz	4.4 kHz
AM *1	6 kHz	12 kHz
FM *2	15 kHz	32 kHz

* 1 with YK-88A optional filter
* 2 with FM-430 optional accessory

Frequency Stability: Better than ± 30×10^{-6} (0°C to +50°C), Within ±200 Hz from 1 to 60 minutes after turn-on: within ±30 Hz any 30 minutes period thereafter
Frequency Accuracy: Better than 10×10^{-6}
RIT Variable Range: More than ± 1 kHz
Audio Output Impedance: 4Ω to 16Ω
Audio Output Power: More than 1.5W across 8Ω (at 10% distortion)

* Will transmit on the new 30, 17 and 12 meter bands, Diodes have been installed to prevent accidental transmission. They may be removed easily when government authorization has been granted for Amateur operation.

Note: Circuit and ratings subject to change without notice due to developments in technology.

CIRCUIT DESCRIPTION

OVERVIEW

The TS-430 is a transceiver and general-coverage receiver featuring double conversion at 48.055 and 8.830MHz intermediate-frequencies. Triple-conversion to 455kHz is used during FM receive operation. A microprocessor based 10Hz or 100Hz step switchable digital VFO system is employed for frequency control. The PLL system reference is a 36MHz master oscillator.

The following features are provided with the TS-430 : dual digital VFOs, 8 memory channels, memory scan, programmable band scan, IF shift, RIT, VOX, CW side tone, speech processor, NB, AF notch, squelch, F step, F lock, Mic UP/DWN.

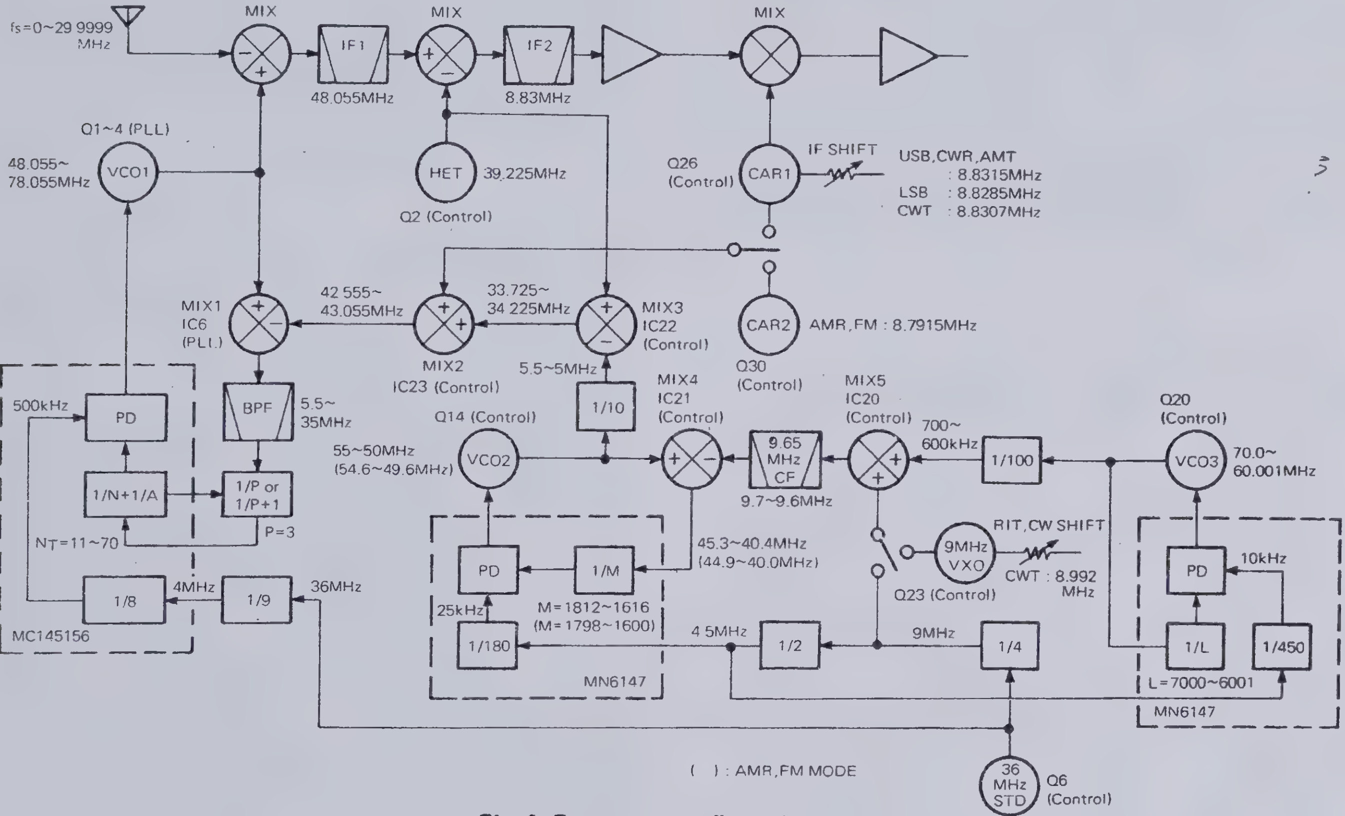


Fig. 1 Frequency configuration

RECEIVER CONFIGURATION

The TS-430 uses a double conversion receiver with a 48.055 MHz 1st intermediate frequency and 8.830MHz 2nd IF for SSB, CW, and AM modes. Triple conversion is used for the FM mode, in which the 3rd IF is 455kHz.

A signal from the antenna passes through one of seven LPF (Low Pass Filters) on the LPF unit, the antenna relay RL1, and enters the RF unit RA terminal. It then passes through the 20dB ATT (ATTENUATOR), controlled by Q14, a 30MHz LPF, the LPF for each band (a combination HPF and LPF for the 0.5 through 1.6MHz band), and the final LPF. The signal is then converted from an unbalanced to a balanced signal by broad-band transformer T2, and is mixed at Q1 & Q2 (JFET's) with the local oscillator signal from the PLL to arrive at the 48.055kHz 1st IF.

The signal passes through the MCF (Monolithic Crystal Filter), is post-amplified by Q3 (3SK74) and mixed at Q5, Q6 (2SK125), the 2nd balanced mixer with the 39.225MHz HET (Heterodyne) signal from the PLL to provide the 8.830MHz 2nd IF. A sample of the signal is picked off and amplified by the NB (Noise Blanker) chain (Q8—Q13). The main portion of this 2nd IF signal passes through the NB gate (D28—D31). The NB is also triggered by Q33, Q34 from a pulse signal supplies off the Control unit at PLL reset. This suppresses the "click" normally heard when one of the PLL loops resets. The signal is then fed to two outputs : one for the SSB, AM and CW modes, which is supplied to the IF unit, and the other, which is amplified by Darlington Pair Q7, Q43 and supplied to the (optional) FM unit. The signal supplied to the IF unit first passes through the MCF for the selected mode and is then amplified by three stages of IF amplification Q1—Q3 (3SK73 x 3). In the SSB and CW modes, the signal from the amplifiers is detected by the product detector D21—D24 (1N60 x 4).

The audio signal in any mode passes through the notch filter IC1 and IC2 (AN6551 x 2) and then the squelch-switching transistor Q46 (2SC2240) ; the output of the transistor is supplied to the AF GAIN control. Q47, Q18, Q19 and Q33 are the squelch control chain for all modes but FM. In the AM mode circuit, the IF output is amplified by Q5. The AGC buffer, and AM detected by D20 (1N60). Its output is fed to the notch filter via buffer amplifier Q6 (2SC2240). D38 and D39 are the AGC rectifiers, Q16 is the AGC amplifier, and Q17 is the AGC-slow time constant switch. Q13 and Q24 are the S meter amplifiers, while in the FM mode Q15 "kills" the IF unit S meter signal : The FM unit supplies the S meter signal during FM operation. In the FM mode, the RF unit FMI output is delivered to the FM unit, where the signal is input to Q5 : MC3357P, a monolithic IC containing the second conversion oscillator, mixer, limiting amplifier, quadrature discriminator, active filter, squelch, scan control, and mute. Q4 : 2SC2240 buffers the detected output and returns this audio signal (via the FAF line) to the IF unit, D26 switch.

FM signal meter drive (FSM) is derived through amplifiers Q6, Q7 : 2SC1815 (Y), transformer T3, and rectifiers D5, D6 : 1N60. The low level audio signal from the AF GAIN control is power amplified by IC5 (μPC2002V), and is then output to the speaker.

Item	Rating
Nominal center frequency	8830kHz
Center frequency deviation	Within ±150Hz at 6dB
Pass bandwidth	±1.2kHz or more at 6dB
Attenuation bandwidth	±1.5kHz or less at 20dB ±2.2kHz or less at 60dB ±3.0kHz or less at 80dB
Ripple	20dB or less
Insertion loss	6dB or less
Guaranteed attenuation	80dB or more within ±3kHz to 1MHz
Input and output impedance	600Ω//15pF

Table 1 MCF (L71-0208-05) YK-88S (IF unit XF1)

Item	Rating
Nominal center frequency	48.055MHz±1kHz
Pass bandwidth	±9.6kHz or more at 3dB
Attenuation bandwidth	±28kHz or less at 10dB
Lipple	0.7dB or less
Insertion loss	2dB or less
Guaranteed attenuation	30dB or more within ±1MHz
Input and output impedance	2kΩ±10%

Table 2 MCF (L71-0214-05) (RF unit XF)

Item	Rating
Center frequency fo	8830.7kHz
Center frequency deviation	fo ±150Hz at 6dB
6dB bandwidth	±250Hz or more
60dB bandwidth	±900Hz or less
Ripple	2dB or less
Loss	6dB ±2dB
Guaranteed attenuation	80dB or more within fo ±2kHz to ±1MHz
Input and output impedance	600Ω/15pF

Table 3 CW crystal filter YK-88C (L71-0211-05) Option

Item	Rating
Center frequency fo	8830.7kHz
Center frequency deviation	fo ±50Hz at 6dB
6dB bandwidth	±125Hz or more
60dB bandwidth	±600Hz or less
Ripple	2dB or less
Loss	8dB ±2dB
Guaranteed attenuation	80dB or more within fo ±2kHz to ±1MHz
Input and output impedance	600Ω/15pF

Table 4 CW crystal filter YK-88CN (L71-0221-05) Option

Item	Rating
Center frequency fo	8830kHz
Center frequency deviation	8830kHz ±150Hz at 6dB
6dB bandwidth	±900Hz or more
60dB bandwidth	±1800Hz or less
Guaranteed attenuation	80dB or more within fo ±2.5kHz to ±1MHz
Ripple	2dB or less
Loss	3dB ±2dB
Input and output impedance	600Ω/15pF

Table 5 SSB crystal filter YK-88SN (L71-0220-05) Option

Item	Rating
Center frequency (fo)	8831.5kHz±250Hz
−6dB bandwidth	6kHz
Attenuation bandwidth	11kHz
Guaranteed attenuation	80dB or more
Ripple	2dB or less
Loss	3dB±2dB
Input and output impedance	600Ω//15pF
Temperature	−10°C~+50°C

Table 6 AM crystal filter YK-88A (L71-0223-05) Option

CIRCUIT DESCRIPTION

TRANSMITTER CONFIGURATION

This transceiver uses a dual conversion transmitter for all operating modes. The audio signal from the microphone is delivered to the IF unit X48-1370-00 for preamplification by Q34, 2SC2240GR. The output from this stage is routed to three circuits. The amplified audio signal continues either to the microphone gain control through emitter follower Q48, 2SC1815Y, or at processor ON, through IC6, μPC1158H2, the processor audio amplifier. Q35 2SC1815Y is the processor AGC amplifier, and establishes the degree of compression, while Q37, 2SC945R is a switch, operated at processor ON, which interrupts the normal, non-processed signal flow. The secondary destinations of Q34's output are the VOX circuit input, and the (optional) FM unit microphone input.

Returning from the microphone gain control, the audio signal is amplified by Q38, 2SC2240GR, and input to the balanced modulator IC7, AN612, along with the 8.8MHz carrier signal developed on the Control unit. In the AM mode, the modulator is unbalanced to output a modulated carrier, while in the CW mode, the modulator is unbalanced and amplifier Q38 is disabled to yield only a controlled carrier (D66, Pin Diode) from IC7. This signal is diode switched (D17, D16, D3) through the 8.8kHz MCF (Monolithic Crystal Filter), and thence to the TX IF amplifier Q41, 3SK73GR. Q27 is the CW keying transistor used to control Q41's operating voltage. ALC is also applied to Q41. Q42 and Q43 are the ALC meter amplifiers, while Q44 "kills" the SSB, CW or AM ALC during FM mode operation. Q32 is a phase-shift audio oscillator supplying sidetone in the CW mode.
The signal then exits the IF unit and is sent to the RF unit via the TIF line. On the RF unit X44-1510-11, the signal is up-converted, mixed with the VCO (voltage controlled oscillator) output, then amplified and sent on to the Final Amplifiers. Q15 and Q16, 3SK73GR are the HET (heterodyne) mixers. The 39.225MHz HET injection signal originates on the Control unit, and is amplified by Q4, 2SC1959Y. In the FM mode, the TIF signal is diode switched off (D35), while the FM unit transmit signal output (FMT) line is switched on (D36) into the HET mixers.
In the FM mode, the audio signal from the Switch unit "L" goes to the FM unit via the FMC line. In the FM-430 unit, the MIC signal is amplified and limited by Q1 : TA7061AP, an OP AMP, and is applied to varicap diode D1 : 1S2208 to modulate crystal X1.
The 8831.5kHz carrier output generated by oscillator Q2 (2SC460) and amplified Q3 (3SK74) is fed via the FMT line back to the RF unit (connector 20) and into the transmitter balanced mixers (Q15, Q16 : 3SK74).
The output of this mixer stage is filtered and immediately mixed with the VCO output by Q17 and Q18, 3SK73GR. The VCO signal also originates on the Control unit. Q19, 2SK125 is a source follower, which feeds Q20, 2SC2538, the pre-driver amplifier. The Drive signal is then sent to the Final unit for amplification.
During XVRTR (transverter) operation, Q23, 2SC1959Y operates as an emitter follower from Q19, supplying a low level transmitter signal output through the XVRTR port. At the same time, Q21, 2SC2703 turns off Q20 to interrupt the normal transmitter signal flow from the RF to the Final unit.

In the Final unit X45-1280-00, the signal is amplified by Q1, 2SC2075, then push-pull amplified by Q2 and Q3, 2SC2509. Q4 and Q5 2SC2290 are the final push-pull amplifiers. D4 and Q6 are the driver bias control elements, and D5 and Q7 are the final transistor bias circuit. The Final unit output is then sent to the Filter unit.

In the Filter unit X51-1290-00, the transmitter output is filtered by one of seven filter circuits, automatically selected from the Control unit. ALC and SWR protection sensing are provided by T1, a toroidal directional coupler, and Q3 and Q5, 2SC1815Y.

RECEIVER ANCILLARY CIRCUITS

NOTCH CIRCUIT

IC11 and IC2 in the IF unit constitute a Bi-Quad filter circuit. The notch frequency is determined by the follow-wing two formulas.

(1) $f_N = \sqrt{R6}/2\pi\sqrt{R3 \cdot R5 \cdot R1 \cdot C1 \cdot C2}$

(2) $R1 \cdot R6 = R4 \cdot R7$

If a variable resistor is used for resistor R3, the notch frequency can be controlled according to formula (1). The notch frequency range is from 350 to 2800Hz, and attenuation is from 25 to 50dB. The correlation between the formula and circuit diagram resistor & capacitor values is :

R1 = R80
C2 = C52
R8 = R77
C1 = C51
R4 = R75
R2 = R81
R3 = R88 + Notch control
R1 = R79
R5 = R76

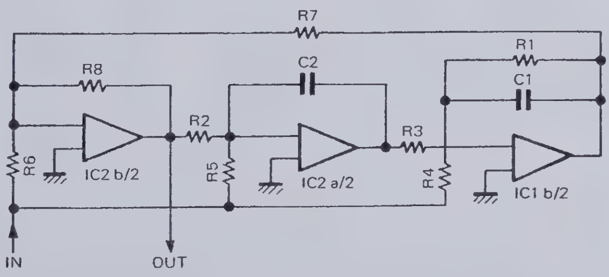


Fig. 2 Theoretical circuit diagram

CIRCUIT DESCRIPTION

TRANSMITTER ANCILLARY CIRCUITS

PROTECTION CIRCUTS

The transmitter output circuit is triple-protected.

- **VSWR Protection**

Reflected power detected by current transformer T1 is rectified by diode D3, amplified by transistor Q3 and added to the ALC circuit. When the VSWR is high, the ALC circuit reduces the drive signal into the power amplifiers.

- **Heat Sink Temperature Protection**

Thermister TH1, mounted on the Final unit heat sink is connected to the inverting inputs of comparators IC1 sections c & d. If the thermistor resistance decreases, due to an excessive increase in heat sink temperature, comparator "d" turns on before comparator "c" since "d's" reference voltage is established higher than that of section "c's". Comparator "d's" output turns on Q6 which starts the fan motor. If the heat sink's temperature continues to rise, due, for example, to continuous transmission or an incorrect load, comparator section "c" turns on Q1 to add a negative D.C. voltage to the ALC circuit. The ALC circuit then forcibly curtails the drive input to the Final unit.

The comparator reference voltages are established for fan turn-on at approximately 65°C, and drive shut-down at approximately 90°C. The fan stops at 60°C because of the hysteresis provided for comparator section "d".

- **Protection using RF voltage**

The transmitter may be overdriven, although the VSWR is not particularly high, depending on the load connected to the antenna terminal. Excessive drive power could exert stress on the Final unit driver transistor 2SC2509. To protect the driver transistor, RF voltage at the emitter of pre-driver 2SC2075 is rectified, amplified by Filter transistor Q2, and added to the ALC circuit. When the RF voltage at the pre-driver is excessive, the ALC circuit reduces the drive power.

VOX (Voice Operated Transmit)

The VOX circuit is contained on the RF unit, Q24 is the VOX amplifier. Q25 & Q26 supply VOX delay. Q27 & Q28 are a Schmitt Trigger used to control RX & TX voltage switching. The speaker-derived ANTIVOX signal is amplified by Q29, Q30 & Q32 and is applied to Q25 to hold-off the VOX from keying on speaker output. In the CW mode, ANTIVOX is disabled by Q31.

PLL CIRCUIT

The TS-430 PLL circuit consists of three phase locked loops and a 36MHz master oscillator to generate all reference frequencies. PLLs 2 & 3 are on the Control unit, and PLL 1 is on the PLL unit. PLL3 uses an MN6147 (IC7) which contains a phase comparator, programmable frequency divider and frequency divider for generating the reference frequency. This IC uses a 10kHz reference frequency, and controls VCO3 to generate frequencies from 70 to 60MHz in 10kHz steps. The 36MHz signal is divided by 8 to 4.5MHz before it is input to PLL3. In PLL3, the 4.5MHz signal is divided by 450 to generate the 10kHz reference signal. The microcomputer (IC1) applies 4-bit serial program data, plus 1 clock data bit to the programmable divider to vary the division ratio from 1/7000 to 1/6001.

The 70 to 60MHz signal generated by VCO3 (Q20 : 2SC1923) is divided by 100 by IC18 (M54459L) to obtain output from 700 to 600kHz. The result is then mixed with the 9MHz reference signal by MIX5 (IC20 : SN16913P) to produce a 9.7 to 9.6MHz signal which is applied to MIX4 (IC21) through a ceramic filter.

PLL2 also uses an MN6147 (IC8). This IC uses 25kHz as its reference frequency and controls VCO2 (Q14) to generate frequencies from 55 to 50MHz. The signal output by VCO2 is mixed with the 9.7 to 9.6MHz signal generated by PLL3 in MIX4 (IC21 : SN16913P) to obtain a 45.3 to 40.4MHz signal, which is applied to the programmable divider in the PLL IC (IC8). The programmable divider uses a division ratio from 1/1812 to 1/1616. Since the divisor is changed in 4 steps, the VCO2 output signal frequency varies from 55 to 50MHz in 100kHz steps.

VCO2 output is divided by 10 at IC19 (μPB551C), then mixed with the 39.225MHz heterodyne signal by MIX3 (IC22 : SN16913P). The resultant 33.725 to 34.225MHz signal (varied in 10Hz steps) is mixed with the 8.83MHz carrier by MIX2 (IC23 : SN16913P) to generate the 42.555 to 43.055MHz signal which is applied to the PLL unit, MIX1 (IC6) in the PLL1 loop. PLL1 uses 4 VCOs (Q1–Q4) to generate the 48.055 to 78.055MHz VCO signal. It uses an MC14156P PLL IC (IC1) and SN74LS112N (IC2) as a swallow (High Speed) counter (with a division ratio of 1/3 or 1/4). the 36MHz reference signal is divided by 9 at IC5 (M74LS112AP) and IC4 (M74LS196P) to obtain a 4MHz signal, and this 4MHz signal is applied to IC1, where it is divided by 8 to obtain the 500kHz reference signal.

The 48.055 to 78.055MHz signal generated by VCO1 is mixed with the signal from PLL2 by MIX1 (IC6) to generate the 5.5 to 35MHz signal. This signal is applied to the programmable divider in the PLL IC (IC1) through the swallow counter. The microprocessor outputs 3-bit serial data to vary the division ratio (N) from 11 to 70. Thus, PLL1 operates as a PLL using a 500kHz reference signal.

Item	Rating
Nominal center frequency (fo)	9.65MHz
3dB Attenuation bandwidth	fo±80kHz or more
Insertion loss	6dB or less $20\cdot\log\left(\frac{E1}{2E2}\right)$
Guaranteed attenuation at 9MHz	40dB or more
Spurious (within 9.65+2MHz) (within 9.65−2MHz)	30dB or more 35dB or more
Voltage capacity	DC50V 1minute
Input and output impedance	330Ω

Table 7 Ceramic filter (L72-0336-05)
(Control unit CF1)

CIRCUIT DESCRIPTION

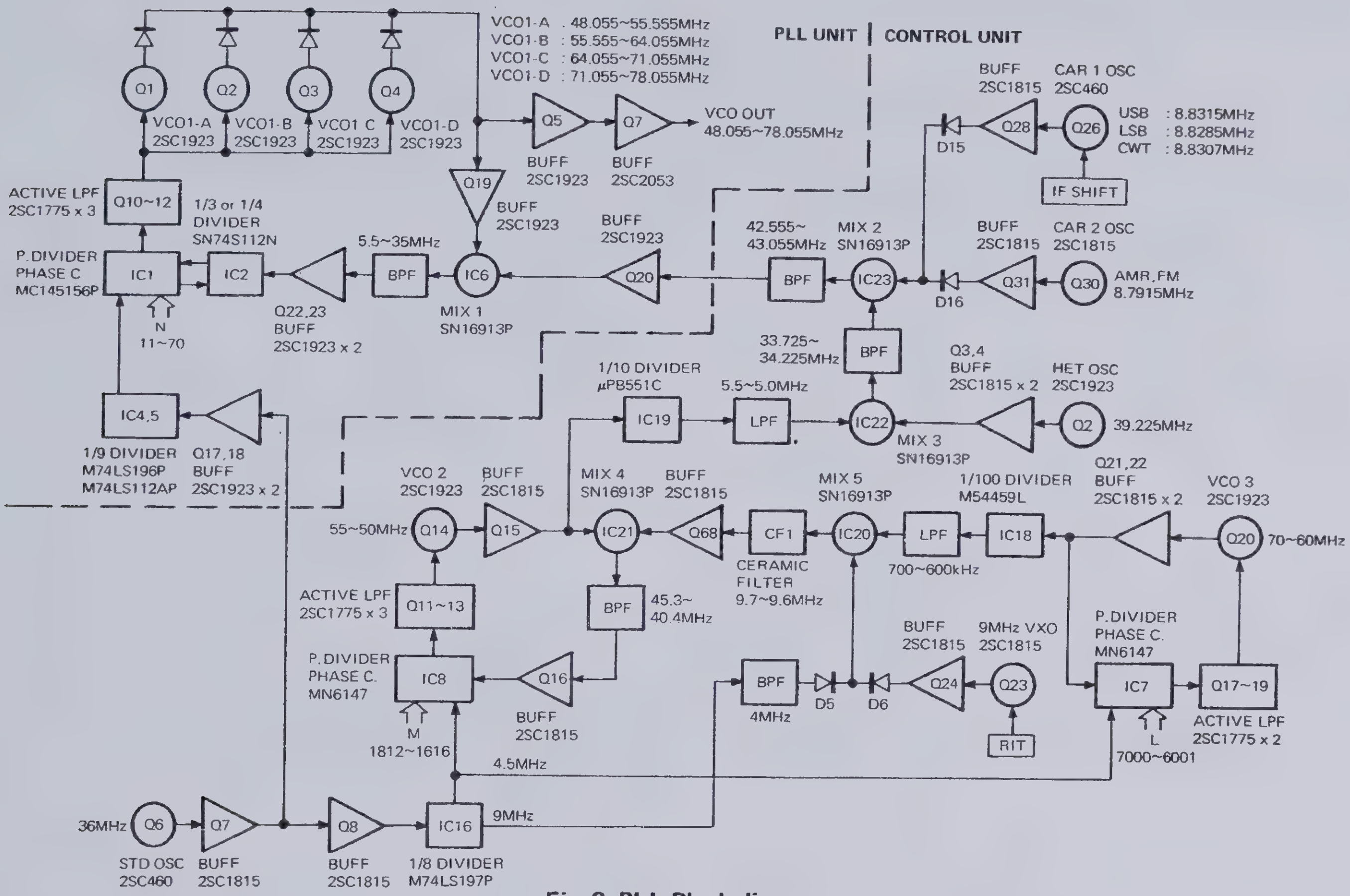


Fig. 3 PLL Block diagram

DIGITAL CONTROL CIRCUIT

The TS-430 digital Control unit consists of a µPD8049C-279 8-bit microcomputer (IC1), 2 I/O expanders, 2 data selectors, a C-MOS RAM IC for memory and a diode matrix for interfacing.

The MODE SW, BAND SW, M-IN, MR, A=B, HOLD, STEP, MIC UP/DOWN and LOCK switches are connected to the data selectors (IC4 and IC5 : TC4512BP) either directly or through the diode matrix so that the setting of each switch is input to the microcomputer as 1 data bit. The FUNCTION, MEMORY CH, MS and PG.S SW switches are also connected to the microcomputer through the diode matrix. Thus, the settings of these switches are input to the microcomputer as 4 data bits.

I/O expander IC3 (µPD8243C) is used to output the frequency division data for the PLLs and the band data. The frequency division data is changed only when the frequency is changed. The frequency range from 0 to 30MHz is divided into 10 band segments, and these segments are selected by band data which is output as 4-bit BCD code. The other I/O expander (IC2) outputs frequency data for the 7-segment display and the digit dynamic drive signal. The clock signal used to dynamically drive the display is generated by astable multivibrator IC14 (TC4011BP), which oscillates at approximately 1 kHz.

The encoder interface circuit (consisting of IC9, IC10 and IC11 [TC4011BPs]) multiplies the 250 pulses/rev. 2-phase clock signal generated by the encoder unit by 4 to obtain a 1000 pulses/rev. clock signal which is applied to the microcomputer. The relationship between the phases is detected by IC13 to determine the tuning knob direction of rotation, and this directional data is applied to the microcomputer as the UP/DOWN signal.

The microcomputer clock signal input terminal is also used to input the speed control data for program scan. A clock signal generated by astable multivibrator IC12 (TC4011BP) is applied to this terminal in the program scan mode. The frequency of this multivibrator can be varied from 50 to 250 Hz by the slide potentiometer located on the top panel.

The memory backup circuit uses a C-MOS RAM (IC6 : µPD5101LC) and a 3V lithium battery. The microcomputer monitors the main power supply voltage using a circuit consisting of D22 (RD9.1EB2) Q38 and Q39 (2SC1815s). When the voltage (normally 13.8V DC) drops below about 9.5V, the microcomputer stops normal operation and starts transferring frequency data to the backup RAM (IC6 : µPD5101LC). The microcomputer then detects a drops in the 5V line voltage and sets the RAM in the standby (or bakcup) state. Current consumption during backup is approximately 0.1µA (typ.), and the built-in lithium battery can backup the RAM for about 5 years. Various keyboard functions have a telltale audio "Beep" heard through the speaker. The control pulse is fed to the IF unit to trigger multivibrator Q30 & Q31, whose output is fed directly to the AF Power amplifire IC5.

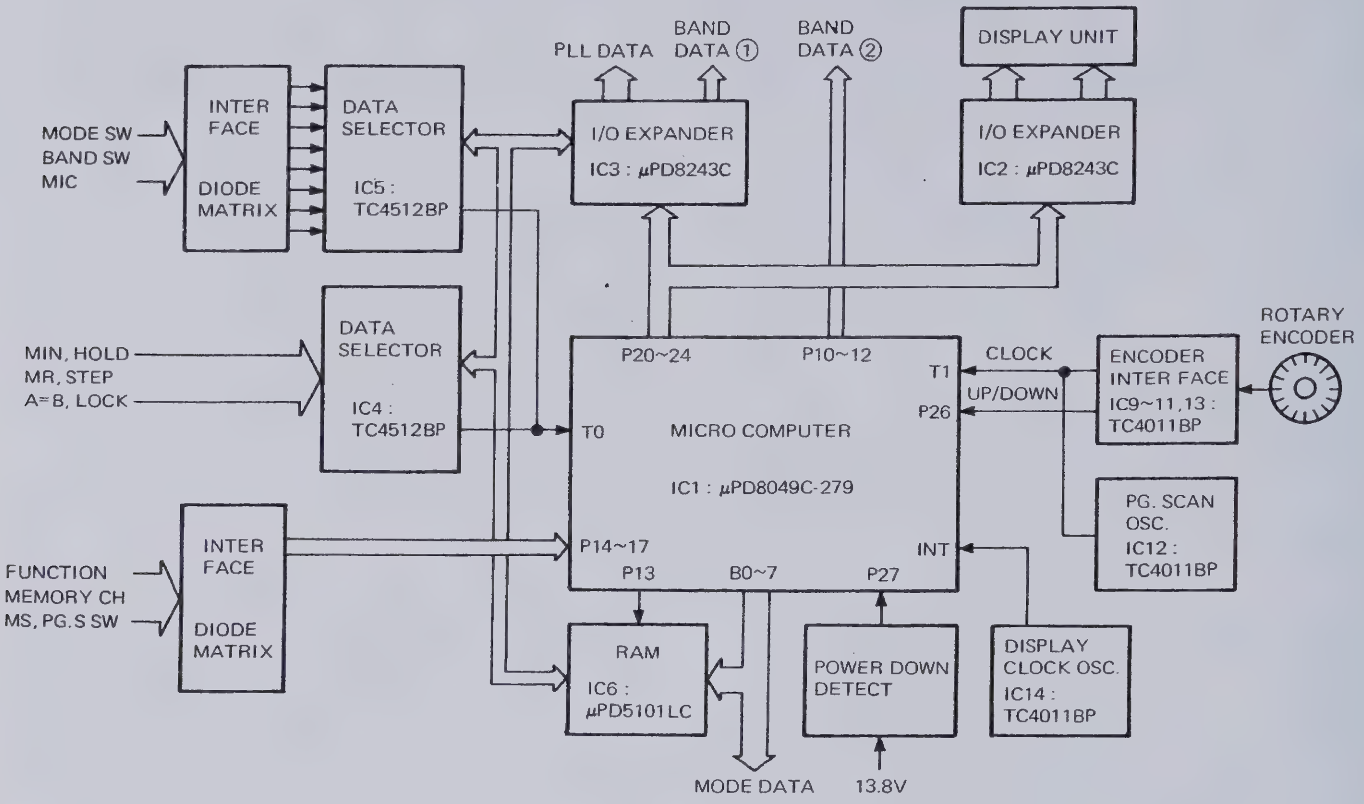


Fig. 4 Digital control system

Terminal No.	Name	Function
1	T0	Encoder clock, P. SCAN clock input
2	XTAL 1	Micro computer clock (5.74MHz) input
3	XTAL 2	
4	$\overline{\text{RESET}}$	Microcomputer reset input operate : "H"
5	$\overline{\text{SS}}$	Normally "H" (5V)
6	$\overline{\text{INT}}$	Display tube dynamic drive clock input (1kHz)
7	EA	Normally "L" (GND)
8	$\overline{\text{RD}}$	Not used, normally open
9	PSEN	
10	WR	
11	ALE	
12	DB0	VFO A indicator output
13	DB1	VFO B indicator output
14	DB2	No memory signal output "L" : Normal
15	DB3	MODE output LSB "H" : When operating
16	DB4	MODE output USB
17	DB5	MODE output CW
18	DB6	MODE output AM
19	DB7	MODE output FM
20	GND	GND
21	P20	I/O EXPANDER control output
22	P21	
23	P22	
24	P23	
25	PROG	
26	VDD	Power supply 5V
27	P10	TX inhibit signal (Out of hum band)
28	P11	TX inhibit signal (Out of hum and WARC band)
29	P12	28MHz Power down output
30	P13	External RAM control output (R/W)
31	P14	P. SCAN input M.CH selector input
32	P15	M. SCAN input
33	P16	FUNCTION input
34	P17	FUNCTION input M.CH input
35	P24	I/O Exp. data selector control output "L" : EX (0), DS (1) "H" : EX (1), DS (2)
36	P25	External RAM control output (CE)
37	P26	Encoder UP/DOWN input "L" : DOWN, "H" : UP
38	P27	Voltage down detection signal input "L" : Power down "H" : Normal
39	T1	Data selector input
40	Vcc	Power supply 5V

Table 8 Function of µPD8049C-279

CIRCUIT DESCRIPTION/SEMICONDUCTOR DATA

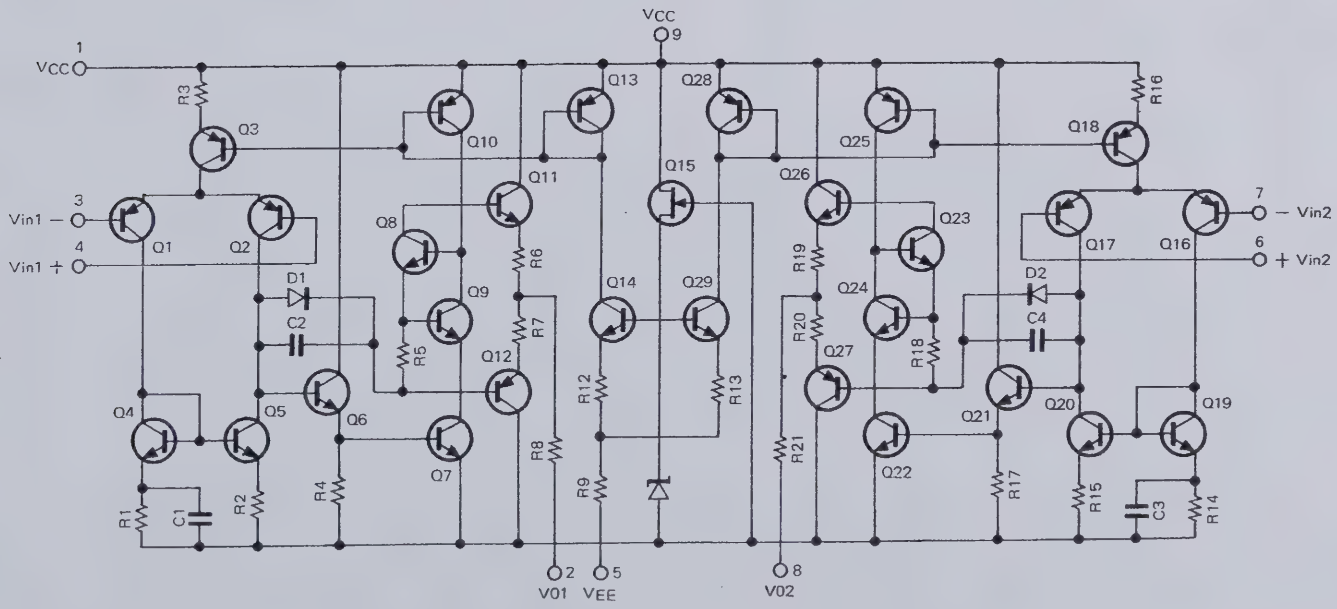
Terminal No.	Name	Function	
24	Vcc	Power supply 5V	
2	P40	BAND data (BCD output)	
3	P41		
4	P42		
5	P43		
6	$\overline{CS}$	Chip selector input	
7	PROG	Control input	
8	P23		
9	P22		
10	P21		
11	P20		
12	GND	GND	
13	P70	PLL 1 data output	PLL 2 3 data output
14	P71	PLL 1 clock output	
15	P72		
16	P73		
17	P63	PLL select signal Normally : "H"	
18	P62	PLL 1 ENABLE	
19	P61	PLL 2 clock output	
20	P60	PLL 3 clock output	
21	P53		External RAM data in-output
22	P52	Data selector output	
23	P51		
1	P50		

BAND data	Frequency
Band 0	0–0.5MHz
1	0.5–1.6MHz
2	1.6–2.5MHz
3	2.5–4MHz
4	4–6.5MHz
5	6.5–7.5MHz
6	7.5–10.5MHz
7	10.5–16MHz
8	16–23MHz
9	23–30MHz

Table 9 I/O EXPANDER (0) IC2: μPD8243C

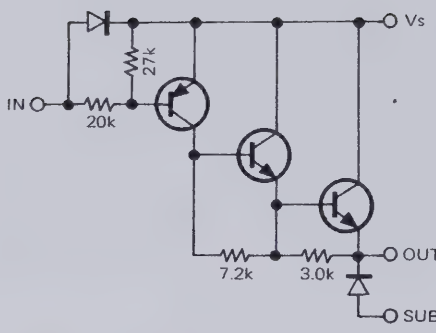
Terminal No.	Name	Function
24	Vcc	Power supply 5V
2	P40	DIGIT output 100Hz
3	P41	DIGIT output 1kHz
4	P42	DIGIT output 10kHz
5	P43	DIGIT output 100kHz
6	$\overline{CS}$	Chip selector input
7	PROG	Control input
8	P23	
9	P22	
10	P21	
11	P20	
12	GND	GND
13	P70	SEGMENT output e
14	P71	SEGMENT output f
15	P72	SEGMENT output g
16	P73	Buzzer output ON : "L"
17	P63	SEGMENT output d
18	P62	SEGMENT output c
19	P61	SEGMENT output b
20	P60	SEGMENT output a
21	P53	DIGIT output M.CH
22	P52	DIGIT output 10Hz
23	P51	DIGIT output 10MHz
1	P50	DIGIT output 1MHz

Table 10 I/O EXPANDER (1) IC3: μPD8243C

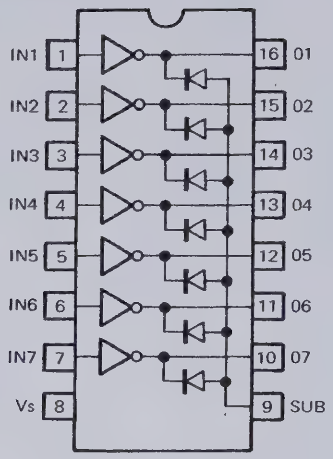


AN6551 Equivalent circuit (IF unit IC1,2)

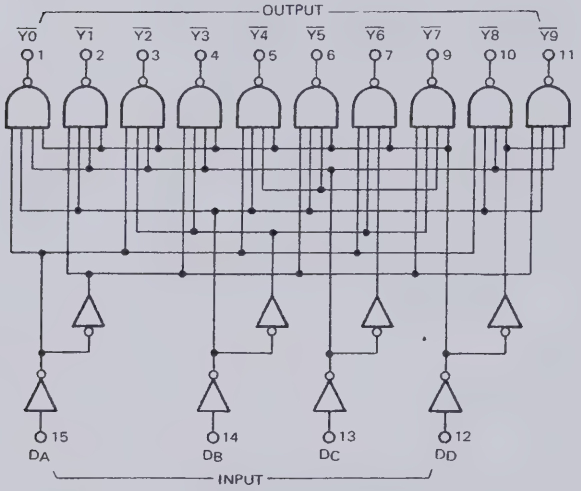
SEMICONDUCTOR DATA



M54561P Equivalent circuit (RF unit IC1)

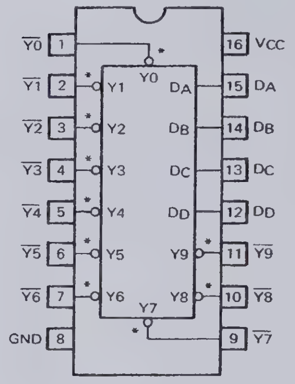


M54561P



M74LS145P Logic circuit (RF unit IC2)

* Open collector output

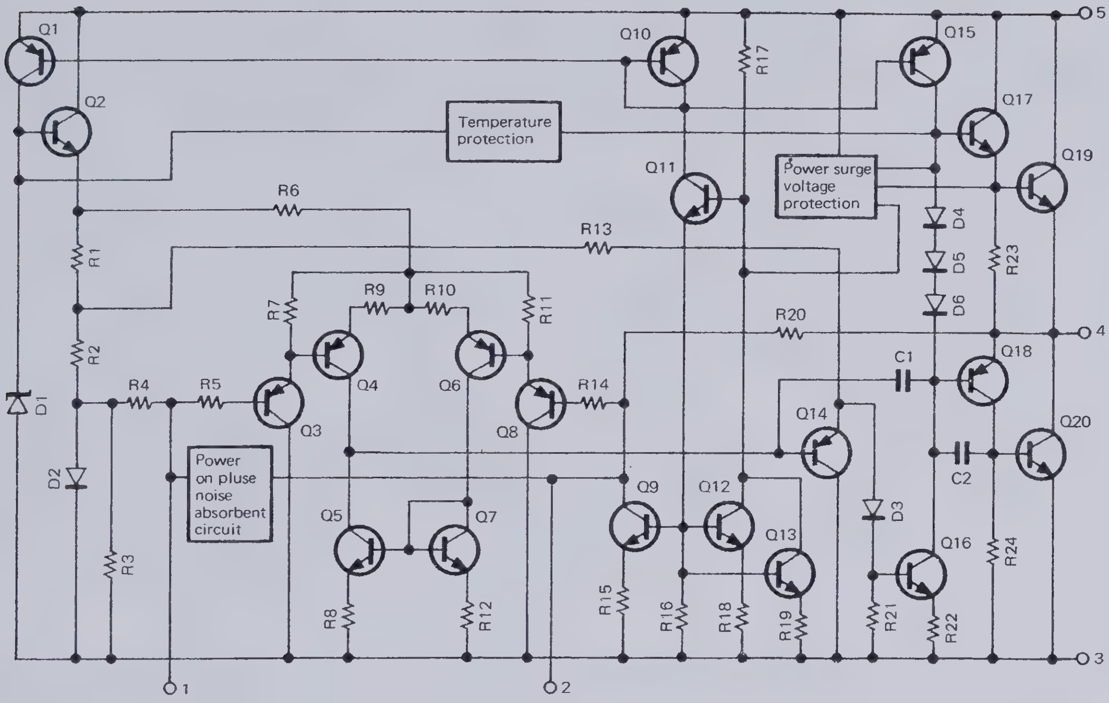


M74LS145P

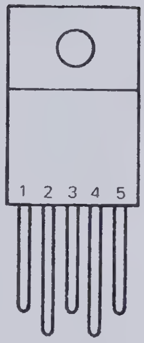
	INPUT				OUTPUT									
Decade digit	DD	DC	DB	DA	$\overline{Y0}$	$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	$\overline{Y4}$	$\overline{Y5}$	$\overline{Y6}$	$\overline{Y7}$	$\overline{Y8}$	$\overline{Y9}$
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
10	H	L	H	L	H	H	H	H	H	H	H	H	H	H
11	H	L	H	H	H	H	H	H	H	H	H	H	H	H
12	H	H	L	L	H	H	H	H	H	H	H	H	H	H
13	H	H	L	H	H	H	H	H	H	H	H	H	H	H
14	H	H	H	L	H	H	H	H	H	H	H	H	H	H
15	H	H	H	H	H	H	H	H	H	H	H	H	H	H

M74LS145P Truth table

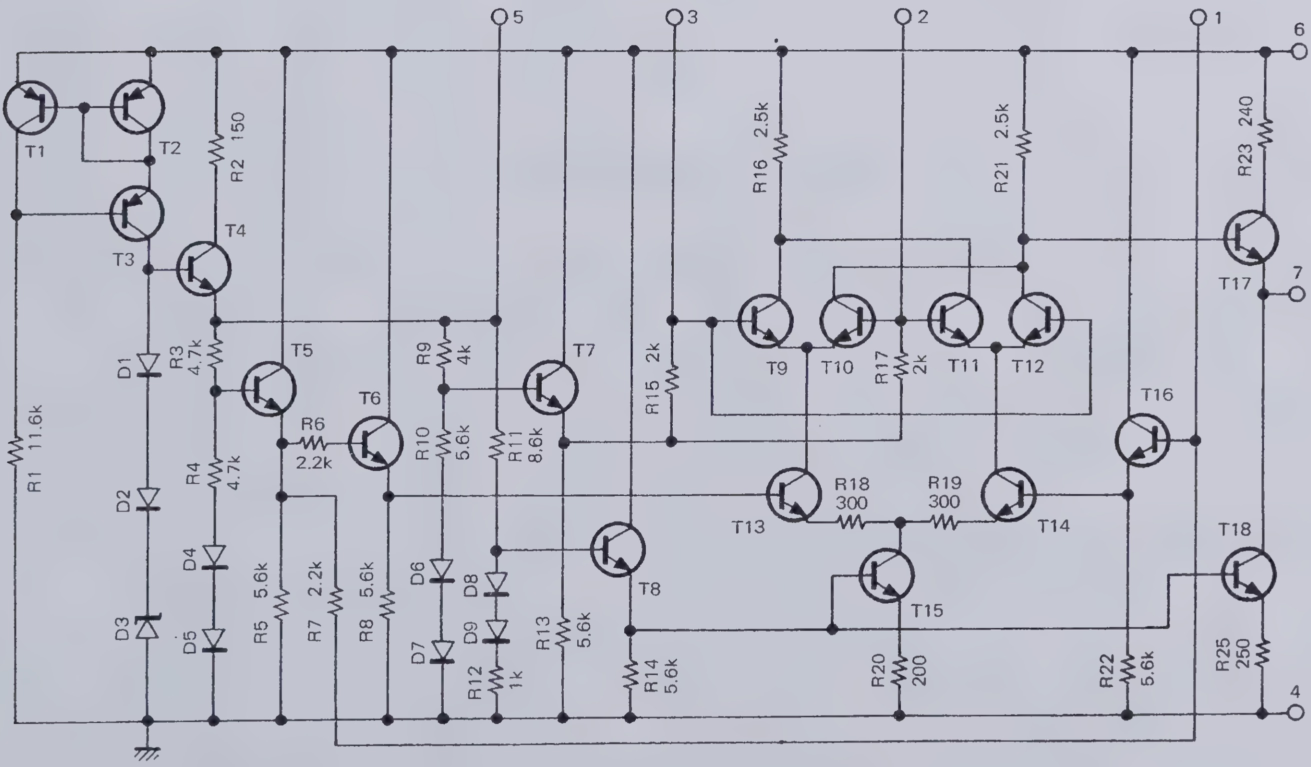
SEMICONDUCTOR DATA



μPC2002V Equivalent circuit (IF unit IC5)

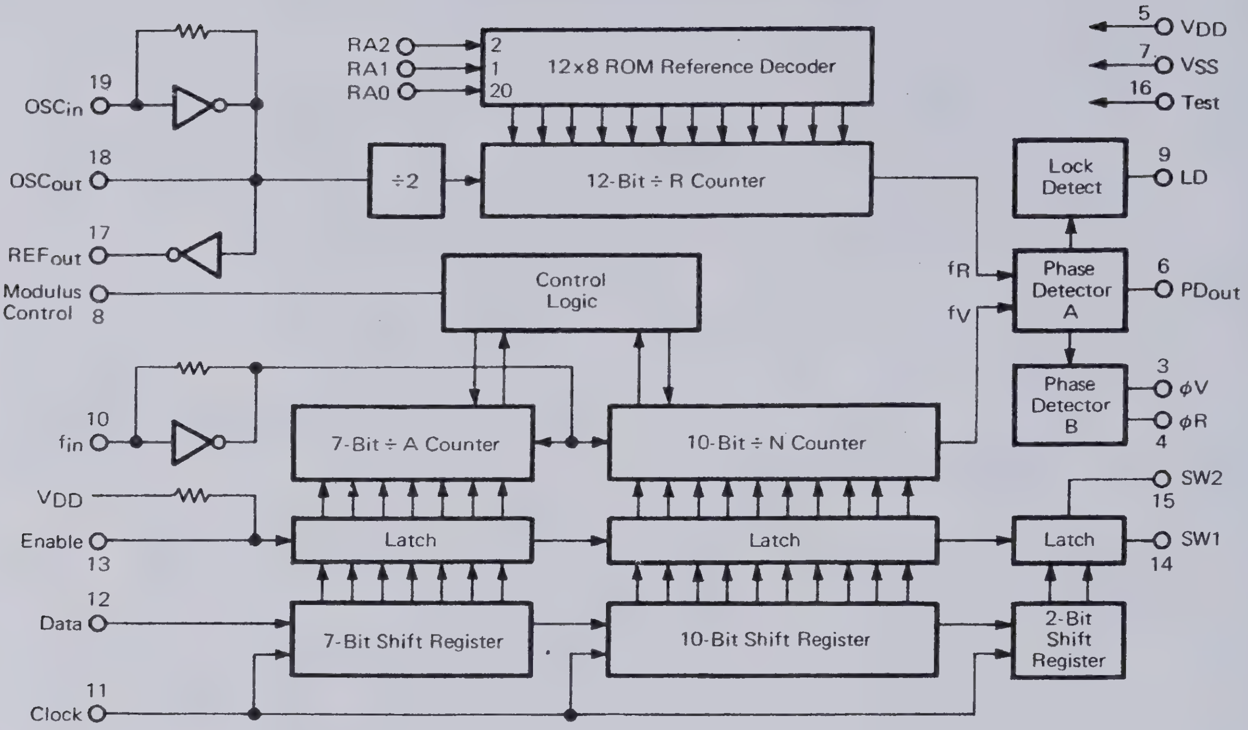


1 : Input
2 : NFB
3 : GND
4 : Output
5 : Power supply + Vcc

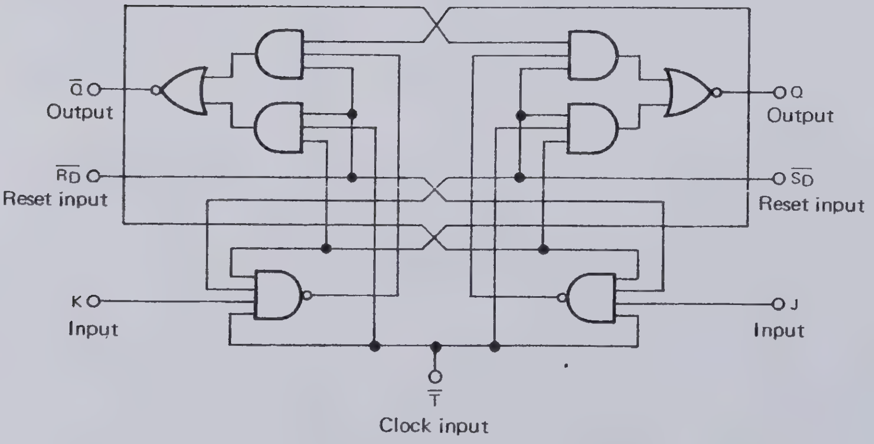


AN612 Equivalent circuit (IF unit IC7)

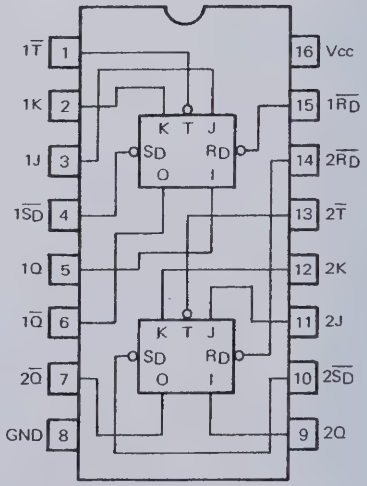
SEMICONDUCTOR DATA



MC14156P Block diagram (PLL unit IC1)

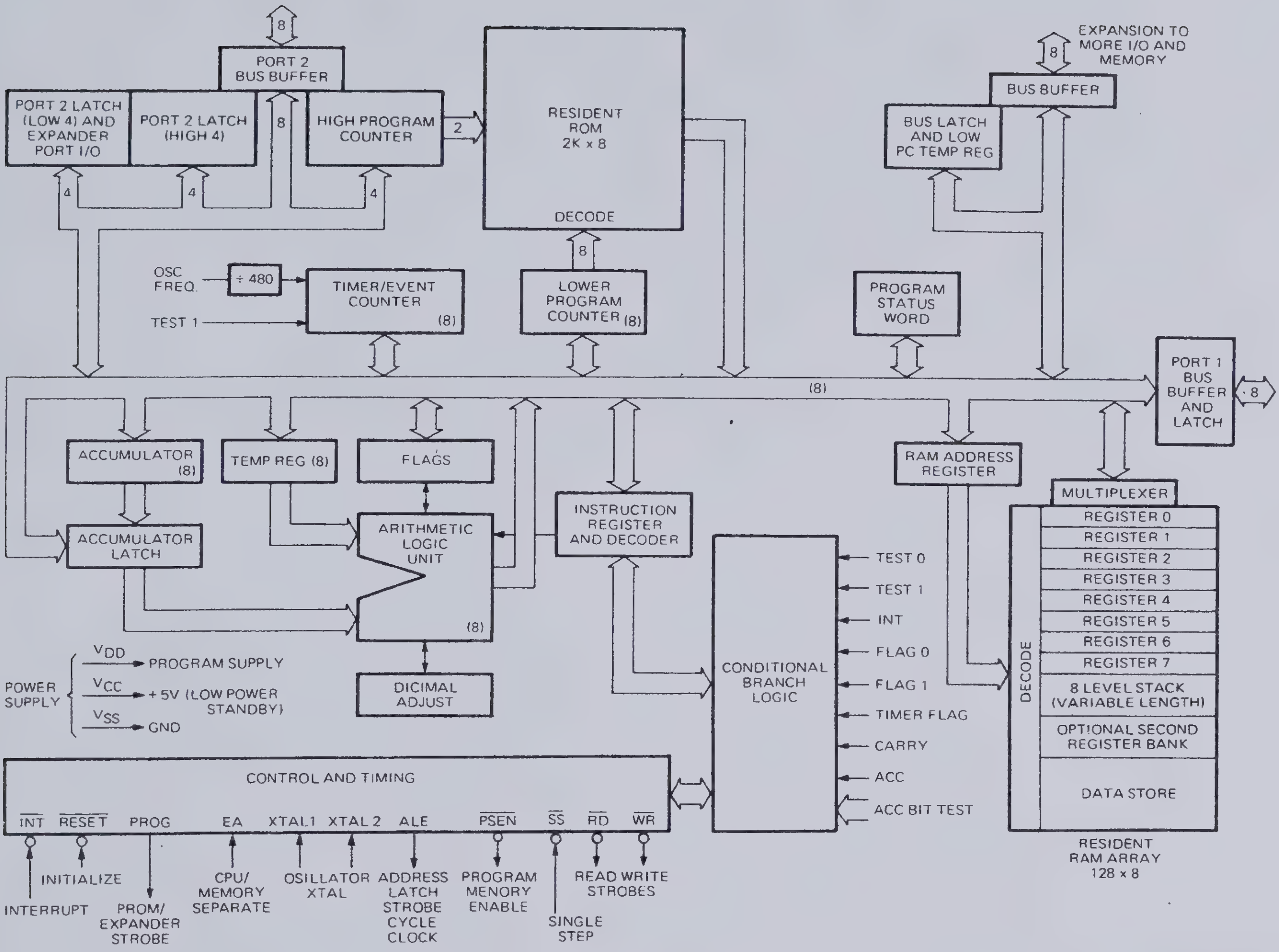


M74LS112AP Logic circuit (PLL unit IC5)

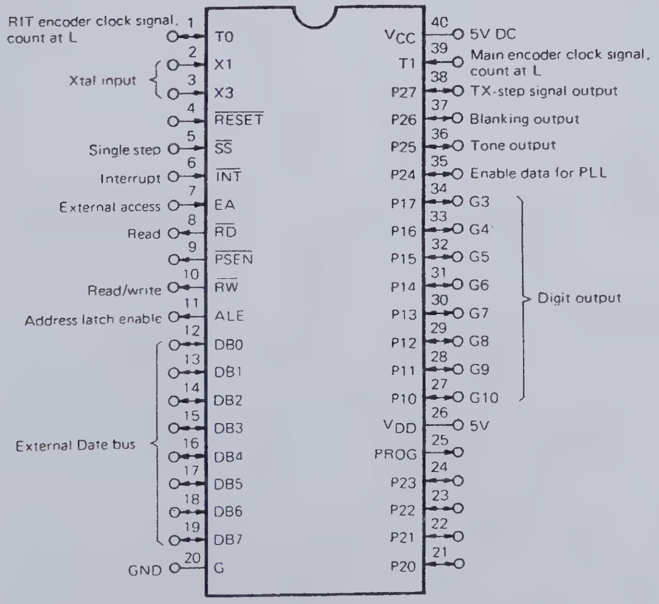


M74LS112AP

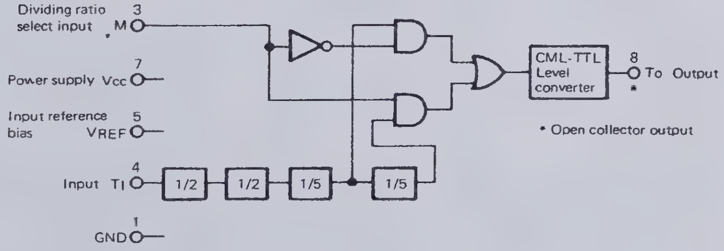
SEMICONDUCTOR DATA



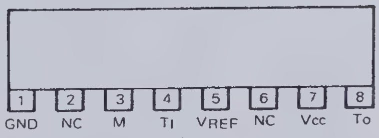
µPD8049C-279 Block diagram (Control unit IC1)



µPD8049C-279

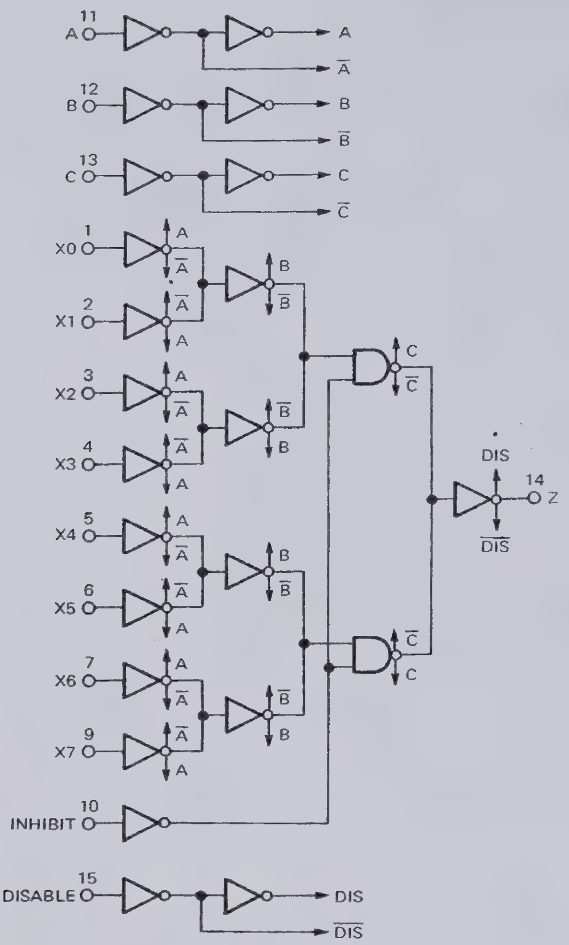


M54459L Block diagram (Control unit IC18)

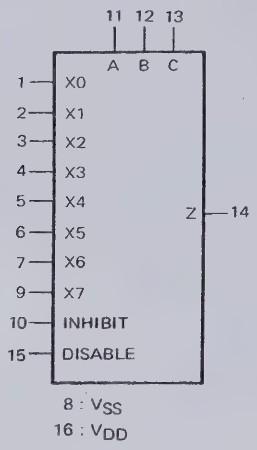


M54459L

SEMICONDUCTOR DATA



TC4512BP Block diagram (Control unit IC4,5)

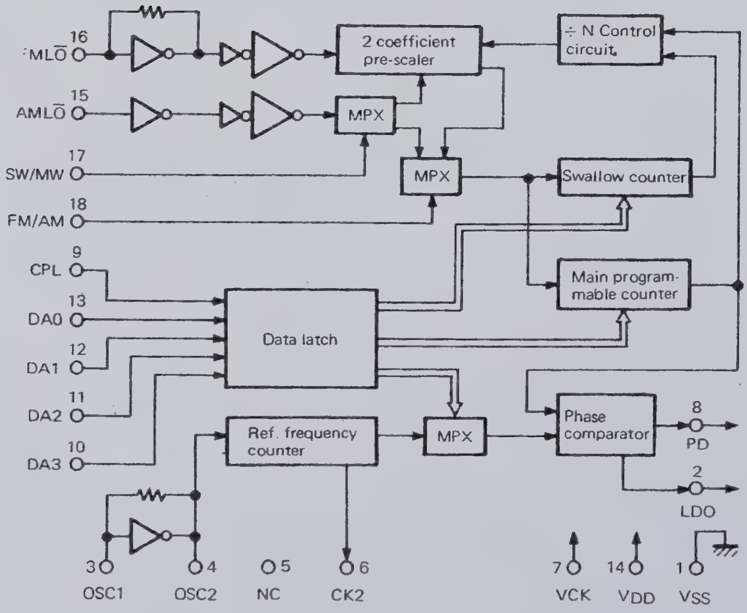


TC4512BP

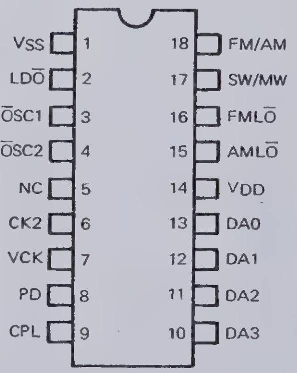
A	B	C	INHIBIT	DISABLE	Z
L	L	L	L	L	X0
H	L	L	L	L	X1
L	H	L	L	L	X2
H	H	L	L	L	X3
L	L	H	L	L	X4
H	L	H	L	L	X5
L	H	H	L	L	X6
H	H	L	L	L	X7
*	*	*	H	L	L
*	*	*	*	H	HZ

* : Don't Care
HZ : High Impedance

TC4512BP Truth table



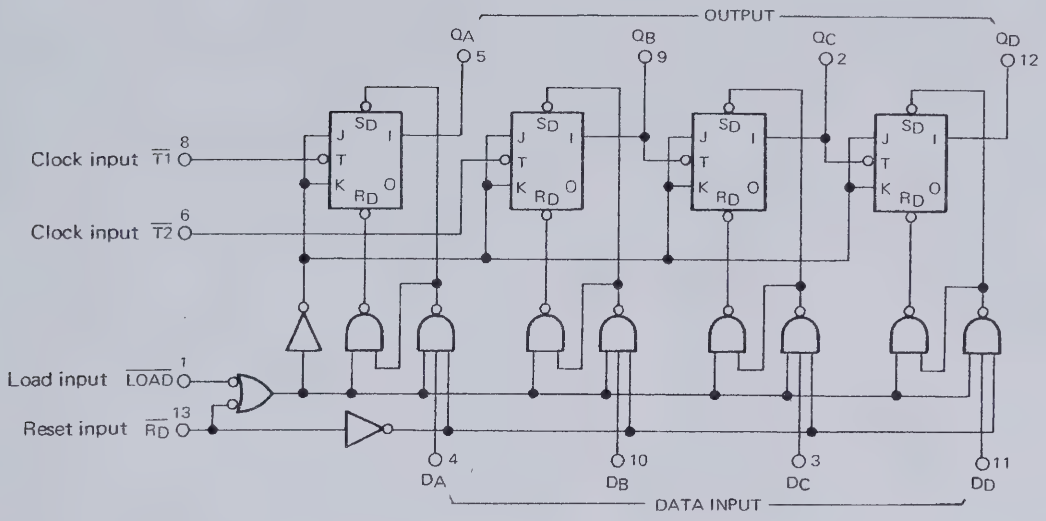
MN6147C Block diagram (Control unit IC7,8)



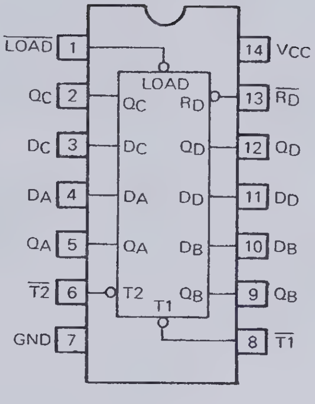
V_{SS}	: Ground	CPL	: Latch clock
LD$\overline{O}$	: OSC circuit output	DA3–DA0	: Data address
$\overline{OSC1}$	: Ext. clock input	V_{DD}	: Main power supply
NC	: No connection	AML$\overline{O}$	: AM local OSC input
CK2	: Clock output (1kHz)	FML$\overline{O}$	: FM local OSC input
VCK	: Clock circuit back up	SW/MW	: SW,MW select
PD	: Phase detector output	FM/AM	: FM,AM select

Clock output (1kHz)

SEMICONDUCTOR DATA


OUTPUT
QA 5
QB 9
QC 2
QD 12
SD
J
T
K
RD
I
O
Clock input $\overline{T1}$ 8
Clock input $\overline{T2}$ 6
Load input $\overline{LOAD}$ 1
Reset input $\overline{RD}$ 13
4 DA
10 DB
3 DC
11 DD
DATA INPUT

M74LS197P Logic circuit (Control unit IC16)



M74LS197P

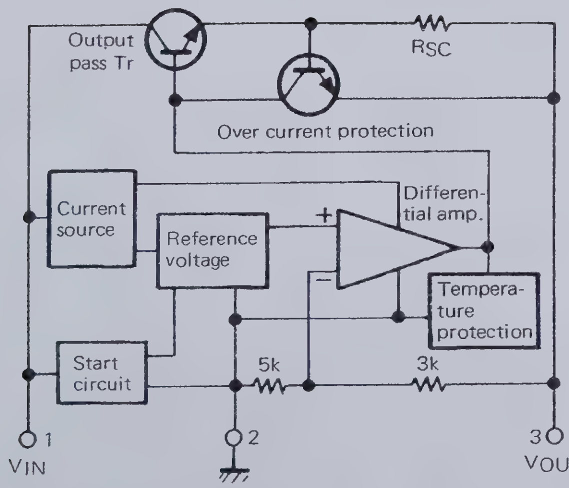
INPUT			OUTPUT			
$\overline{T}$	$\overline{R_D}$	$\overline{LOAD}$	Q_A	Q_B	Q_C	Q_D
X	L	X	L	L	L	L
X	H	L	D_A	D_B	D_C	D_D
↓	H	H	COUNT			

↓ : Change H to L
× : Either H or L

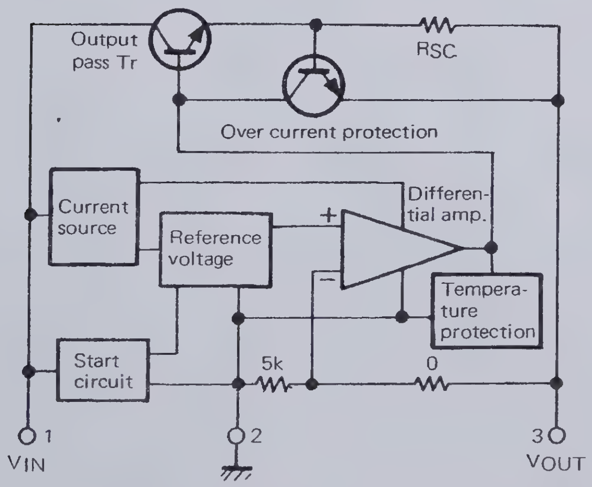
M74LS197P Truth table (1)

	OUTPUT			
COUNT	Q_A	Q_B	Q_C	Q_D
0	L	L	L	L
1	H	L	L	L
2	L	H	L	L
3	H	H	L	L
4	L	L	H	L
5	H	L	H	L
6	L	H	H	L
7	H	H	H	L
8	L	L	L	H
9	H	L	L	H
10	L	H	L	H
11	H	H	L	H
12	L	L	H	H
13	H	L	H	H
14	L	H	H	H
15	H	H	H	H

M74LS197P Truth table (2)



AN7808 Block diagram (IF unit IC8)



AN7805 Block diagram (IF unit IC9)

PARTS LIST

CAPACITORS

CC 45 TH 1H 220 J
1 2 3 4 5 6

1 = Type ..... ceramic, electrolytic, etc
2 = Shape ..... round, square, etc
3 = Temp coefficient
4 = Voltage rating
5 = Value
6 = Tolerance

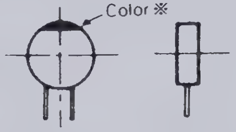
● Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color ※	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	− 80	− 150	− 220	− 330	− 470	−750

2nd Word	G	H	J	K	L
ppm/°C	± 30	± 60	± 120	± 250	± 500

Example CC45TH = −470 ± 60 ppm/°C

CC45



● Rating voltage

2nd word / 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	—
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	—
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	—

● Capacitor value

0 1 0 = 1pF
1 0 0 = 10pF
1 0 1 = 100pF
1 0 2 = 1000pF = 0.001μF
1 0 3 = 0.01μF

2 2 0 = 22pF
1st number
2nd number
Multiplier

● Tolerance

Cord	C	D	G	J	K	M	X	Z	P	No cord
(%)	± 0.25	± 0.5	± 2	± 5	± 10	± 20	+ 40 − 20	+ 80 − 20	+ 100 − 0	More than 10μF − 10 ～ + 50 Less than 4.7μF − 10 ～ + 75

Less than 10 pF

Cord	B	C	D	F	G
(pF)	± 0.1	± 0.25	± 0.5	± 1	± 2

Symbol	Destination
K	U.S.A.
W	Europe
T	Britain
M	General market

Abbreviation		Abbreviation	
Cap	Capacitor	ML	Mylar
C	Ceramic	S	Styren
E	Electrolytic	T	Tantalum
MC	Mica		

Resistors not listed in this parts list are standard, fixed carbon composition, 1/4W or 1/8W.
The resistance values, in ohms, are indicated on the schematic diagram.

SEMICONDUCTOR

N : New parts

Item	Remarks	Name
Diode		1N60
		1S1007
		1S1555
		1S1587
		1S2588
		BA379
		ITT310
	N	LN66(R)
		S31C
		V06B
Vari-cap		1SV53A
		1SV54GC
Varistor		MV5T
		MV13
		SV03Y
Zener diode		BZ-240
		RD3.0EB2
		RD4.3EB3
		RD5.1EB1
		RD6.2EB1
		RD6.2EB2
		RD9.1EB2
		RD9.1EB3
		RD10EB1

Item	Remarks	Name
LED	N	LN247RP
	N	LN347GP
	N	LN447YP
		SG238D
		SY438D
Surge absober		ERZC07DK201
		ERZD03DK331
Thermistor		25D29
		32D27
	N	SDT1000F
Display tube	N	FIP9D7
Photo TR	N	PN126S
TR		2SA562(Y)
		2SA733(R)
		2SA1015(Y)
		2SC460(B)
		2SC945(Q)
		2SC945(R)
		2SC1775(E)
		2SC1815(GR)
		2SC1815(Y)
		2SC1923(O)
		2SC1959(Y)

Item	Remarks	Name
		2SC2053
		2SC2075
		2SC2240(GR)
		2SC2290*J
		2SC2509
		2SC2538
		2SC2603(E)
		2SC2703(O)
	N	2SC2703(O or Y)
		2SD880(Y)
FET		2SK30A(O)
		2SK125
		2SK192A(GR)
		2SK192(Y)
		3SK73(GR)
		3SK74(L)
IC		74LS90N
	N	AN612
	N	AN6551
	N	AN7805
	N	AN7808
		HD74LS90P
		LM358P

Item	Remarks	Name
	N	M74LS112AP
	N	M74LS145P
		M74LS196P
	N	M74LS197P
	N	M54459L
	N	M54561P
		MB3614
		MC145156P
	N	MN6147C
		SN74LS90N
		SN74S10N
		SN74S112N
		SN16913P
		TC4011BP
		TC4512BP
		TC5065BP
		TC5067BP
		μPB551C
	N	μPC1158H2
	N	μPC2002V
		μPD5101LC
	N	μPD8049C-279
		μPD8243C

PARTS LIST

Part No.	Re-marks	Description	Ref. No.
		TS-430 GENERAL	
A01-0935-02	N	Case (A) upper	
A01-0936-02	N	Case (B) lower	
A20-2457-13	N	Panel	
B05-0708-04		SP grill cloth	
B30-0817-15		Pilot lamp 14V, 80mA	
B31-0639-05	N	Meter	
B39-0407-04		Spacer x 2 Assistant foot	
B42-1767-04	N	VOX name plate Case (A)	
B42-1768-04	N	Switch plate	
B43-0683-14	N	Name plate **K,M,W**	
B43-0684-04	N	Name plate **T**	
B46-0410-10		Warranty card **K**	
B50-4006-10	N	Instruction manual **K,M**	
B50-4007-00	N	Instruction manual **T**	
B50-4130-00	N	Instruction manual **W**	
CE04W1A470M		E 47 10V Encoder ass'y	C1
CK45E2H222P		C 0.0022 500V	C3
CK45F1H103Z		C 0.01	C2,4–8
CK45F1H473Z		C 0.047	C1
D09-0306-04	N	Slit plate Moving	
D09-0307-04	N	Slit plate Fixed	
D40-0626-15	N	Detector mech. ass'y	
E04-0152-05		UHF type receptacle ANT	
E06-0751-05		7P DIN socket REMOTE	
E06-0851-05		8P DIN socket X.VERTOR, W SW	
E06-0852-05		8P DIN socket ACC,W/O SW	
E07-0751-05		7P DIN plug Accessory	
E07-0851-05		8P DIN plug Accessory	
E08-0671-05		6P square socket	
E11-0403-05		Phone jack EXT.SP	
E11-0404-05		3P phone jack KEY	
E11-0412-05		3P phone jack PHONE	
E12-0001-15		Phone plug Accessory	
E20-0315-05		Mold terminal 3P	
E23-0417-05		Pressure weld terminal x 2	
E29-0407-05		Bridge connector	
E30-1637-05		4 cores cable	
E30-1638-05		DC cord Accessory	
E31-0431-15		Speaker cord	
E31-2154-05	N	CAL cord Accessory	
F05-2034-05		Fuse 20A	
F15-0641-04	N	Switch mask Case (A)	
G02-0505-05		Knob fixed spring x 4	
G13-0665-04	N	Cushion MODE	
G13-0666-04	N	Cushion x 2 Panel	
G13-0668-04		Cushion VOX	
G53-0515-04		Packing (B) x 2	
H01-4543-04	N	Packing carton (inside)	
H03-2083-04	N	Packing carton (outside)	
H10-2565-02	N	Packing fixture (F)	
H10-2566-02	N	Packing fixture (R)	
H12-1315-04	N	Cushion	
H20-1410-03		Protective cover	
H25-0079-04		Protective bag MIC **M**	
H25-0112-04		Protective bag Cord	
H25-0116-04		Protective bag	
J02-0323-05		Foot x 4	
J02-0403-04		Rubber foot x 4	
J02-0407-04		Assistant foot	
J13-0404-05		Fuse holder	
J21-2573-04		Foot mounting hardware x 2	
J31-0141-04		Spacer ring MIC	
J61-0019-05		Vinyle tie x 10	
J61-0408-05		Nylon band x 27	
K01-0410-05	N	Carring handle	
K21-0768-04	N	Main knob	
K23-0710-04		Knob (inside) x 4 AF,MIC,NOTCH,RIT	
K23-0753-04		Pointer knob x 2 FUNCTION,M.CH	
K27-0426-14		BAND knob x 2 BAND	
K29-0741-24		Knob (outside) x 4 RF,CAR,SQL, IF SHIFT	
K29-0758-04		Push knob POWER	
K29-0767-04	N	Push knob x 4 1MHz STEP, NB, ATT,NOTCH	
K29-0768-04	N	Push knob RIT	
K29-0769-04	N	Push knob MODE(LSB,USB, CW,AM,FM)	
K29-0770-04	N	Push knob A=B,LOCK,STEP, M.CH,MR,M.IN,MS,PG.S,HOLD	
K29-0771-04	N	Knob ring Main knob	
N09-0256-05		GND screw x 4 Sub, rear panel	
N09-0646-04	N	Round screw x 2	
N10-2030-46		Nut x 2 Mold terminal	
N14-0115-05		Flange nut GND	
N14-0509-05		Wing nut GND	
N15-1040-46		Flat washer x 2 GND	
N16-0030-46		Spring washer	
N30-2004-46		Round screw x 5	
N30-2604-46		Round screw x 17	
N30-3008-46		Round screw x 2 Mold terminal	
N30-4016-46		Round screw GND	
N32-2604-46		Flat screw x 9	
N32-2606-46		Flat screw x 8	
N32-3006-46		Flat screw x 5	
N33-3006-41		Round flat screw x 4 SP	
N33-3006-45		Round flat screw x 4 Panel	
N35-3006-41		Bind screw x 16 Case (A),(B)	
N35-3006-46		Bind screw x 16 Panel	
N87-2606-46		Self tapping screw x 2 VFO A,B	
N87-3006-41		Self tapping screw x 6	
N87-3006-46		Self tapping screw x 8	
N87-3012-46		Self tapping screw x 33	
N88-3006-46		Flat tepping screw x 16	
N89-3006-45		Bind tapping screw x 4 Final	
R12-2411-06		Trim. pot. 5kΩ(B) x 2 Encoder ass'y	VR1,2
RS14AB3A100J		MF 10Ω 1W	R5
RS14AB3D472J		MF 4.7kΩ 2W	R6
R92-0662-05	N	Cement 10mΩ 5W	R1
S40-2437-05		Push switch POWER	S1

PARTS LIST

Part No.	Re-marks	Description	Ref. No.
T03-0027-15		Speaker	
T91-0352-05		Microphone Accessory **M**	
W02-0328-10	N	Encoder ass'y	
W09-0326-05		Lithium battery CR2032	
X41-1470-00	N	Switch unit	
X44-1510-11	N	RF unit	
X45-1280-00	N	Final unit	
X48-1270-00	N	IF unit	
X50-1910-00	N	PLL unit	
X51-1290-00	N	Filter unit	
X53-1290-00	N	Control unit	
X54-1710-00	N	Display unit	

SWITCH UNIT (X41-1470-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1C222M		E 2200 16V	C2,3	2
CK45B1H102K		C 0.001	C10,11	2
CK45F1H103Z		C 0.01	C5,6	2
CK45F1H473Z		C 0.047	C1,4	2
C91-0456-05		C 0.047	C7,8,12	3
E06-0853-05		8P metal socket MIC		1
E08-0272-05	N	Mini connector 2P		1
E08-0373-05	N	Mini connector 3P		1
E23-0401-05		Round terminal		1
E40-0273-05		Mini connector 2P		5
E40-0173-05		Mini connector 4P		1
E40-0573-05		Mini connector 5P		1
E40-0673-05		Mini connector 6P		4
L15-0016-05		Choke coil	CH1	1
N10-2030-46		Nut		2
N30-3008-46		Round screw 3 x 8		2
R12-4410-05		Trim. pot. 50kΩ	VR1	1
R13-1401-05	N	Pot. 1kΩ(B) ANTI VOX	VR8	1
R13-4401-05	N	Pot. 50kΩ(B) VOX GAIN	VR6	1
R13-6401-05	N	Pot. 250kΩ(B) DELAY, SCAN	VR7,9	2
R19-3415-05	N	Pot. 10kΩ(A) x 2 MIC/ CAR	VR4	1
R19-3416-05	N	Pot. 10kΩ(B), 10kΩ(F) AF/RF	VR2	1
R19-3417-05	N	Pot. 10kΩ(B),10kΩ(F) RIT/SHIFT	VR3	1
R24-9403-15	N	Pot. 250kΩ/10kΩ(B) 50kΩ(B) NOTCH/SQL	VR5	1
S29-1427-05	N	Rotary switch FUNCTION	S2	1

Part No.	Re-marks	Description	Ref. No.	Q'ty
S29-1428-05	N	Rotary switch M.CH	S1	1
S36-2408-05	N	Paddle switch SEND/ REC, VOX/MAN	S14,15	2
S36-2411-05	N	Paddle switch PROC, ALC/IC, MAR/WIDE	S16–18	3
S40-2440-15	N	Push switch LOCK, STEP, M.CH,MS, PG.S, HOLD, 1MHz STEP, RIT NB, ATT, NOTCH	S6–8,11–13, 19–23	11
S40-2441-15	N	Push switch A=B, MR, M.IN	S5,9,10	3
S50-1409-05		Tact switch BAND	S3,4	2
S50-1411-05		Tact switch MODE	S24–28	5

RF UNIT (X44-1510-11)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CC45RH1H010C		C 1P	C141	1
CC45RH1H030C		C 3P	C144,200	2
CC45RH1H050C		C 5P	C93,145	2
CC45RH1H070D		C 7P	C138,140	2
CC45RH1H100D		C 10P	C80,90,134,143	4
CC45RH1H101J		C 100P	C73	1
CC45RH1H270J		C 27P	C101	1
CC45RH1H330J		C 33P	C158	1
CC45RH1H560J		C 56P	C77,78	2
CC45SL1H030C		C 3P	C122	1
CC45SL1H050C		C 5P	C152,159	2
CC45SL1H070D		C 7P	C154	1
CC45SL1H101J		C 100P	C70,71,104,110	4
CC45SL1H121J		C 120P	C58,166,186	3
CC45SL1H151J		C 150P	C59	1
CC45SL1H180J		C 18P	C199	1
CC45SL1H181J		C 180P	C53	1
CC45SL1H221J		C 220P	C46	1
CC45SL1H271J		C 270P	C48,54	2
CC45SL1H330J		C 33P	C72,79	2
CC45SL1H390J		C 39P	C3	1
CC45SL1H470J		C 47P	C2,106,107, 157	4
CC45SL1H560J		C 56P	C63,189	2
CC45SL1H680J		C 68P	C1,64	2
CC45SL1H820J		C 82P	C190	1
CE04W1A101M		E 100 10V	C180	1
CE04W1A220M		E 22 10V	C84	1
CE04W1A470M		E 47 10V	C178,179	2
CE04W1C100M		E 10 16V	C108	1
CE04W1H010M		E 1 50V	C15,23,29,34,37, 45,50,55,60,66, 129,165,177,191	14
CE04W1H3R3M		E 3.3 50V	C173,182	2
CE04W1H4R7M		E 4.7 50V	C174	1
CE04W1HR47M		E 0.47 50V	C108,170	2
CK45B1H102K		C 0.001	C85,92,98–100, 114,116,124,155	9
CK45B1H122K		C 0.0012	C8,26	2
CK45B1H152K		C 0.0015	C18,20,25	3
CK45B1H222K		C 0.0022	C24	1
CK45B1H391K		C 390P	C40,41	2
CK45B1H471K		C 470P	C36,42,47,49	4
CK45B1H561K		C 560P	C125	1
CK45B1H681K		C 680P	C30,31,35	3

PARTS LIST

Part No.	Re-marks	Description	Ref. No.	Q'ty
CK45F1H103Z		C 0.01	C5,61,65,81–83, 87,91,96,97,103, 105,109,111,113, 115,117,120,127, 128,133,135,147, 153,160–162,169, 175,183,184,187, 188,192,202	35
CK45F1H223Z		C 0.022	C14,22,28,32,38, 43,51,56,88,89, 95,112,118,119, 121,123,126,132, 136,137,139,156, 163,164,168,195 196	27
CQ92M1H103K		ML 0.01	C176	1
CQ92M1H223K		ML 0.022	C181	1
CQ92M1H472K		ML 0.0047	C171	1
CQ92M1H473K		ML 0.047	C172	1
C90-0838-05		E 1 50V	C193	1
C91-0105-05		C 0.0047	C7,10,13,74,75	5
C91-0125-05		C 0.0027	C6,19	2
C91-0131-05		C 0.01	C146,148–150	4
C91-0132-05		C 0.01	C11,12,16,17	4
C91-0456-05		C 0.047	C4,9,21,27,33, 39,44,52,57,62, 67–69,86,102, 130,131,151,185, 194,197,201	22
C91-0498-05		C 0.35P	C142	1
E04-0157-05		Mini pin jack A		3
E23-0512-05		Terminal		1
E40-0273-05		Mini connector 2P		8
E40-0373-05		Mini connector 3P		2
E40-0473-05		Mini connector 4P		1
E40-0573-05		Mini connector 5P		3
E40-0673-05		Mini connector 6P		2
E40-0773-05		Mini connector 7P		1
J31-0502-04		PC board collar		6
J42-0428-05		PC board bushing		6
L19-0324-05		Wide bandwidth transf.	T3,23	2
L19-0328-05		Wide bandwidth transf.	T24	1
L19-0344-05		Wide bandwidth transf.	T2	1
L30-0506-05		Tuning coil	T11	1
L30-0511-05		Tuning coil 8.83MHz	T14	1
L34-0535-05		Tuning coil	T15	1
L34-0536-05		Tuning coil	T16	1
L34-0697-05		Tuning coil	T18	1
L34-0857-05		Tuning coil	T7	1
L34-0858-05		Tuning coil	T22	1
L34-0859-05		Tuning coil	T5,21	2
L34-0860-15		Tuning coil	T20	1
L34-0862-05		Tuning coil	T17	1
L34-0942-05		Tuning coil	T13	1
L34-2159-05		Tuning coil	T12	1
L34-2142-05	N	Tuning coil	T4,10	2
L34-2143-05	N	Tuning coil	T1	1
L34-2144-05	N	Tuning coil	T8	1
L34-2145-05	N	Tuning coil	T6	1

Part No.	Re-marks	Description	Ref. No.	Q'ty
L34-2146-05	N	Tuning coil	T19	1
L40-1001-02		Ferri-inductor 10μH	L6–8	3
L40-1001-14		Ferri-inductor 10μH	L15,17,41,65,66	5
L40-1011-03		Ferri-inductor 100μH	L48,53	2
L40-1011-14		Ferri-inductor 100μH	L67	1
L40-1021-03		Ferri-inductor 1mH	L3,44	2
L40-1092-14		Ferri-inductor 1μH	L28	1
L40-1292-14		Ferri-inductor 1.2μH	L31,33	2
L40-1501-03		Ferri-inductor 15μH	L47	1
L40-1511-03		Ferri-inductor 150μH	L68	1
L40-1511-13		Ferri-inductor 150μH	L63	1
L40-1511-14		Ferri-inductor 150μH	L5,50,51,55,64	5
L40-1592-14		Ferri-inductor 1.5μH	L25	1
L40-1892-01		Ferri-inductor 1.8μH	L54	1
L40-1892-14		Ferri-inductor 1.8μH	L27,29	2
L40-2201-14		Ferri-inductor 22μH	L11	1
L40-2211-14		Ferri-inductor 220μH	L4,45	2
L40-2282-01		Ferri-inductor 0.22μH	L2	1
L40-2282-14		Ferri-inductor 0.22μH	L42	1
L40-2292-14		Ferri-inductor 2.2μH	L19,24,26	3
L40-2701-14		Ferri-inductor 27μH	L10,12	2
L40-3301-14		Ferri-inductor 33μH	L62	1
L40-3382-01		Ferri-inductor 0.33μH	L1,46,56	3
L40-3382-14		Ferri-inductor 0.33μH	L38	1
L40-3391-14		Ferri-inductor 3.3μH	L18,60	2
L40-3982-14		Ferri-inductor 0.39μH	L35,36,39,40,43	5
L40-3991-14		Ferri-inductor 3.9μH	L21,22	2
L40-4701-03		Ferri-inductor 47μH	L49,52,57	3
L40-4701-13		Ferri-inductor 47μH	L59	1
L40-4701-14		Ferri-inductor 47μH	L13,14,61	3
L40-4791-14		Ferri-inductor 4.7μH	L23	1
L40-5682-14		Ferri-inductor 0.56μH	L37	1
L40-5691-14		Ferri-inductor 5.6μH	L20	1
L40-6811-03		Ferri-inductor 680μH	L9	1
L40-6822-14		Ferri-inductor 0.68μH	L30,32	2
L40-8282-14		Ferri-inductor 0.82μH	L34	1
L40-8291-14		Ferri-inductor 8.2μH	L16	1
L71-0214-05		MCF 48.055MHz	XF	1
L92-0110-05		Ferrite-bead	L70,71	2
R12-1412-05		Trim. pot. 1kΩ	VR1–4	4
R12-3428-05		Trim. pot. 47kΩ	VR5	1
R90-0517-05		Resistor block 4.7kΩ x 7	RB1	1
S51-1404-05		Relay G2E	RL1	1

100W FINAL UNIT (X45-1280-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CC45CH1H220J		C 22P	C5	1
CC45SL2H220J		C 22P 500V	C29	1
CC45SL2H101J		C 100P 500V	C10	1
CC45SL2H271J		C 270P 500V	C34,35	2
CE04W1C100M		E 10 16V	C17,22	2
CE04W1E101M		E 100 25V	C19,23	2
CK45B1H102K		C 0.001	C21	1
CK45B1H103K		C 0.01	C13,14,26,27	4

PARTS LIST

Part No.	Re-marks	Description	Ref. No.	Q'ty
CK45B1H471K		C 470P	C1	1
CK45F1H103Z		C 0.01	C33	1
CK45F1H473Z		C 0.047	C6,7,28	3
CM73F2H122J		Laminated cap. 0.0012 500V	C15	1
CM93D2H561J		MC 560P 500V	C30	1
C91-0456-05		C 0.047	C2–4,8,9,16, 18,20,24,25,31,32	12
C91-1004-05	N	Chip cap. 0.0068 50V	C11,12	2
E23-0401-05		Round terminal		1
E40-0273-05		Mini connector 2P		1
E40-0275-05		Pin connector 2P		1
E40-0373-05		Mini connector 3P		1
F01-0785-05	N	Heat sink		1
F07-0846-03	N	Heat sink cover		1
F09-0405-14		Fan		1
F20-0078-05		Insulating sheet		3
F29-0014-05		Shoulder washer		7
F29-0406-03		Fan motor ass'y		1
L19-0338-05		Input matching transf.	T1	1
L19-0342-05	N	Drive transf.	T2	1
L19-034J-05	N	Final transf.	T3	1
L33-0617-05		Choke coil	L11	1
L33-0651-05		Choke coil	L5–10	6
L33-0652-05		Choke coil 0.7μH	L1	1
L40-1011-03		Ferri-inductor 100μH	L12	1
L40-1021-03		Ferri-inductor 1mH	L3,4	2
L40-1511-03		Ferri-inductor 150μH	L2	1
N15-1030-46		Washer		4
N30-2604-46		Round screw 2.6 x 4		5
N30-3006-46		Round screw 3 x 6		3
N30-3008-46		Round screw 3 x 8		4
N35-3006-45		Bind screw 3 x 6		4
N87-3006-46		Self tapping screw 3 x 6		8
N89-3006-45		Bind tapping screw 3 x 6		6
R12-1406-05		Trim. pot. 1kΩ (B)	VR1,2	2
RC05GF2H150J		Solid 15Ω 1/2W	R15,16	2
RC05GF2H221J		Solid 220Ω 1/2W	R8,11	2
RC05GF2H3R9J		Solid 3.9Ω 1/2W	R6	1
RS14AB3D150J		MF 15Ω 2W	R23	1
RS14GB3D2R2J		MF 2.2Ω 2W	R12,13	2
RS14GB3F390J		MF 39Ω 3W	R14,17	2
R92-015C-05		Short jumper		9
T42-0301-05		Fan motor		1

IF UNIT (X48-1370-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
C05-0309-05		Ceramic trimmer 40P	TC1	1
CC45SL1H050C		C 5P	C142	1
CC45SL1H100D		C 10P	C30	1
CC45SL1H101J		C 100P	C32,91,94	3
CC45SL1H150J		C 15P	C165,166	2
CC45SL1H221J		C 220P	C64,153	2
CC45UJ1H470J		C 47P	C63,65,125,137, 149	5
CC45UJ1H330J		C 33P	C34	1
CE04BW1HR22M		E 0.22 50V	C55	1
CE04BW1HR47M		E 0.47 50V	C99	1
CE04W0J470M		E 47 6.3V	C121	1
CE04W1A101M		E 100 10V	C47,147	2
CE04W1A221M		E 220 10V	C98	1
CE04W1A470M		E 47 10V	C39,56,116,150, 151,158	6
CE04W1C100M		E 10 16V	C81,101	2
CE04W1C220M		E 22 16V	C112	1
CE04W1H0R1M		E 0.1 50V	C57	1
CE04W1H010M		E 1 50V	C44,50,62,68, 70,72,93,100, 102,103,105,111, 118–120,135,146	17
CE04W1H100M		E 10 50V	C53,97	2
CE04W1HR22M		E 0.22 50V	C58,164	2
CE04W1HR47M		E 0.47 50V	C41,48,54,59, 106	5
CE04W1H4R7M		E 4.7 50V	C40,43,104	3
CK45B1H102K		C 0.001	C14,21,26,33, 130,148	6
CK45B1H471K		C 470P	C127	1
CK45F1H103Z		C 0.01	C2,3,12,25,36, 38,61,69,71,76, 82,123,126,128, 136,138,144,145, 156,157,160	21
CK45F1H223Z		C 0.022	C1,4–11,13, 16–20,23,24, 28,29,31,66,73, 107,139–141	26
CQ92M1H102K		ML 0.001	C52,122	2
CQ02M1H103K		ML 0.01	C108,109	2
CQ92M1H104K		ML 0.1	C77,90	2
CQ92M1H123K		ML 0.012	C86–89	4
CQ92M1H153K		ML 0.015	C96	1
CQ92M1H222K		ML 0.0022	C37	1
CQ92M1H223K		ML 0.022	C110	1
CQ92M1H333K		ML 0.033	C42,46	2
CQ92M1H392K		ML 0.0039	C51	1
CQ92M1H472K		ML 0.0047	C80	1
CQ92M1H473K		ML 0.047	C74,83,85,95	4
CQ92M1H822K		ML 0.0082	C154	1
CS16E1ER47M		T 0.47 25V	C161	1
CS15E1VR22M		T 0.22 35V	C159	1
C90-0838-05		E 1 50V	C49,67	2
C90-0840-05		E 10 10V	C60,84	2
C90-0847-05		E 47 10V	C92,152	2
C90-0848-05		E 47 16V	C115	1
C90-0864-05	N	E 220 10V	C75	1
C90-0866-05		E 470 6.3V	C79	1
C91-0119-05		C 0.047	C15,22,27,45,78, 113,114,117,124	9
C91-1008-05		C 0.022	C162,163	2

PARTS LIST

Part No.	Re-marks	Description	Ref. No.	Q'ty
E23-0512-05		Terminal		2
E29-0413-05		1P connector (female)		1
E40-0273-05		Mini connector 2P		13
E40-0373-05		Mini connector 3P		2
E40-0473-05		Mini connector 4P		4
E40-0573-05		Mini connector 5P		3
E40-0673-05		Mini connector 6P		3
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		1
F20-0516-05		Insulating sheel		1
F29-0014-05		Shoulder washer		1
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7
L34-0535-05		Tuning coil	L3,9	2
L34-0536-06		Tuning coil	L4	1
L34-0708-05		Tuning coil	L1	1
L34-2077-05		Tuning coil	L2	1
L40-1011-14		Ferri-inductor 100μH	L14,15	2
L40-1021-03		Ferri-inductor 1mH	L5	1
L40-1511-03		Ferri-inductor 150μH	L10,11	2
L40-3391-03		Ferri-inductor 3.3μH	L6	1
L40-4711-03		Ferri-inductor 470μH	L13	1
L40-1511-13		Ferri-inductor 150μH	L16	1
L71-0208-05		MCF YK-88S	XF1	1
N09-0641-05		Screw		4
N30-3006-46		Round screw 3 x 6		4
R12-1408-05		Trim. pot. 4.7kΩ	VR4,5,9	3
R12-1412-05		Trim. pot. 1kΩ	VR1	1
R12-3427-05		Trim. pot. 10kΩ	VR2,8,12	3
R12-3428-05		Trim. pot. 47kΩ	VR6,7,10	3
R12-6405-05	N	Trim. pot. 470kΩ	VR3,11	2
R90-0559-05	N	Inline block	IB1,3–7	6
R92-0150-05		Short jumper		51

PLL UNIT (X50-1910-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CC45CH1H050C		C 5P	C10,14,18,24,34, 66	6
CC45CH1H120J		C 12P	C67	1
CC45CH1H180J		C 18P	C32	1
CC45CH1H270J		C 27P	C42	1
CC45CH1H330J		C 33P	C13,19,25,38,43	5
CC45RH1H050C		C 5P	C86	1
CC45RH1H070D		C 7P	C89	1
CC34RH1H080D		C 8P	C85,87	2
CC34RH1H100D		C 10P	C84,88	2
CC45RH1H560J		C 56P	C17	1
CC45RH1H680J		C 68P	C9	1
CC45SH1H470J		C 47P	C23	1
CC45SL1H101J		C 100P	C59	1
CC45SL1H151J		C 150P	C41	1
CC45SL1H680J		C 68P	C83	1
CC45SL1H221J		C 220P	C100	1
CC45TH1H050C		C 5P	C29	1
CC45TH1H330J		C 33P	C30	1
CC45TH1H390J		C 39P	C28	1
CE04W1A101M		E 100 10V	C44	1
CE04W1A470M		E 47 10V	C8,11,15,21,27 49,55	7
CE04W1V100M		E 10μ 16V	C78	1
CK45B1H102K		C 0.001	C77,91–93,101	5
CK45B1H222K		C 0.0022	C5	1
CK45F1H103Z		C 0.01	C1–4,12,16, 22,26,33,36,54, 57,62,69–74,79, 82,90,97,98	24
CK45F1H223Z		C 0.022	C94–96	3
CQ92M1H102K		ML 0.001	C47	1
CQ92M1H104K		ML 0.1	C46	1
C91-0119-05		C 0.047 (SR)	C37,39,48,52,65	5
C91-0131-05		C 0.01	C6	1
C91-0456-05		C 0.047	C7,31,35,40,45, 50,51,53,58,60, 63,64,68,75,81, 99,102	17
E04-0157-04		Mini pin jack A		1
E23-0046-04		Square terminal		2
E40-0273-05		Mini connector 2P		2
E40-0473-05		Mini connector 4P		2
E40-0673-05		Mini connector 6P		1
J31-0502-04		PC board collar		6
J42-0428-05		PC board bushing		6
L19-0344-05	N	Wide bandwidth transf.	T5	1
L34-0851-05		Tuning coil	T6,9	2
L34-0852-05		Tuning coil	T1	1
L34-0853-05		Tuning coil	T2	1
L34-0854-05		Tuning coil	T3	1
L34-0855-05		Tuning coil	T4	1
L34-0856-05		Tuning coil	T7,8	2
L40-1011-03		Ferri-inductor 100μH	L23,27	2
L40-1011-14		Ferri-inductor 100μH	L32	1
L40-1511-03		Ferri-inductor 150μH	L9,11,20,21,25	5
L40-2282-01		Ferri-inductor 0.22μH	L15	1
L40-3301-03		Ferri-inductor 33μH	L22	1
L40-3382-01		Ferri-inductor 0.33μH	L14,16,17	1
L40-4701-03		Ferri-inductor 47μH	L5–8,26,30 31	7
L40-4711-03		Ferri-inductor 470μH	L10,18,19,24,28, 29	6
L40-4711-13		Ferri-inductor 470μH	L13,33	2
L40-4782-02		Ferri-inductor 0.47μH	L12	1
R92-0150-05		Short jumper		12

PARTS LIST

FILTER UNIT (X51-1290-00)

Part No.	Re marks	Description	Ref. No.	Q'ty
C05-0043-05		Ceramic trimmer 20P	TC1	1
CC45SL2H030C		C 3P 500V	C82	1
CC45SL2H100D		C 10P 500V	C65,72	2
CC45SL2H101J		C 100P 500V	C35,60	2
CC45SL2H120J		C 12P 500V	C14	1
CC45SL2H121J		C 120P 500V	C38,51,40	3
CC45SL2H180J		C 18P 500V	C46	1
CC45SL2H151J		C 150P 500V	C4,7	2
CC45SL2H181J		C 180P 500V	C3,18,24,34,57, 68	6
CC45SL2H221J		C 220P 500V	C15,26,39,47,79	5
CC45SL2H271J		C 270P 500V	C21	1
CC45SL2H330J		C 33P 500V	C37,52	2
CC45SL2H391J		C 390P 500V	C12,29,36	3
CC45SL2H470J		C 47P 500V	C23,48,55,61	4
CC45SL2H471J		C 470P 500V	C6,8,17,25	4
CC45SL2H560J		C 56P 500V	C13,45,64,71	4
CC45SL2H680J		C 68P 500V	C28,43,58,81	4
CC45SL2H681J		C 680P 500V	C9	1
CC45SL2H820J		C 82P 500V	C98,106	2
CE04W1C100M		E 10 16V	C84	1
CE04W1H010M		E 1 50V	C88	1
CE04W1HR47M		E 0.47 50V	C86	1
CK45F1H103Z		C 0.01	C1,74,75,77,78, 83,87,93,94,99, 102–104	13
CK45F1H473Z		C 0.047	C19,31,32,41,42, 53,54,62,73,76, 80,85,105	13
CM93D2H102J		MC 0.001	C16	1
CM93D2H182J		MC 0.0018	C5	1
CM93D2H821J		MC 820P	C95	1
C91-0119-05		C 0.047 (SR)	C2,10,11,20,63, 89–92,101	10
E04-0154-04		Coax. connector		1
E04-0157-04		Mini pin jack		1
E23-0512-04		Square terminal		2
E29-0413-05		1P connector (female)		1
E40-0273-05		Mini connector 2P		4
E40-0373-05		Mini connector 3P		3
E40-0473-05		Mini connector 4P		2
E40-0673-05		Mini connector 6P		1
J31-0502-04		PC board collar		6
J42-0428-05		PC board bushing		6
L33-0672-05		Ferri-inductor 100µH	L21–36	16
L34-3038-05		LPF coil A 1.5–2.5	L1	1
L34-3039-05		LPF coil B 1.5–2.5	L2	1
L34-3054-05	N	LPF coil E 4–6.5	L5	1
L34-3055-05	N	LPF coil F 4–6.5	L6	1
L34-3056-05	N	LPF coil G 6.5–10.5	L7	1
L34-3057-05	N	LPF coil H 6.5–10.5	L8	1
L34-3058-05	N	LPF coil J 10.5–16	L9	1
L34-3059-05	N	LPF coil K 10.5–16	L10	1
L34-3060-05	N	LPF coil L 16–23	L11,12	2
L34-3062-05	N	LPF coil N 23–30	L13,14	2
L34-3081-05	N	LPF coil C 2.5–4	L3	1
L34-3082-05	N	LPF coil D 2.5–4	L4	1
L39-0406-05		Detector coil	T1	1
L40-1011-13		Ferri-inductor 100µH	L4	1
L40-1011-14		Ferri-inductor 100µH	L37–40	4
L40-1021-03		Ferri-inductor 1mH	L15–17	3
L40-1511-03		Ferri-inductor 150µH	L18,19	2
R12-0427-05		Trim. pot. 500Ω	VR5	1
R12-2410-05		Trim. pot. 5kΩ	VR4	1
R12-3434-05		Trim. pot. 10kΩ	VR3	1
R12-4411-05		Trim. pot. 50kΩ	VR1,2	2
RC05GF2H181J		Solid 180Ω 1/2W	R40	1
R92-0150-05		Short jumper		20
S51-1404-05		Relay G2E	RL2–15	14
S51-2407-05		Relay FBR321	RL1	1

CONTROL UNIT (X53-1290-00)

Part No.	Re marks	Description	Ref. No.	Q'ty
C05-0035-05		Ceramic trimmer 50P	TC1	1
C05-0067-05		Ceramic trimmer 25P	TC5,6	2
C05-0309-05		Ceramic trimmer 40P	TC2–4	3
CC45CH1H0R5C		C 0.5P	C47	1
CC45CH1H020C		C 2P	C31,116,135	3
CC45CH1H150J		C 15P	C3,30,33,36,178, 179	6
CC45CH1H220J		C 22P	C136	1
CC45CH1H560J		C 56P	C29,38	2
CC45RH1H030C		C 3P	C58	1
CC45RH1H050C		C 5P	C67	1
CC45RH1H070D		C 7P	C57	1
CC45RH1H100D		C 10P	C56	1
CC45RH1H120J		C 12P	C6,66,68	3
CC45RH1H220J		C 22P	C16,18,55,124	4
CC45RH1H270J		C 27P	C127	1
CC45RH1H560J		C 56P	C115,117	2
CC45RH1H820J		C 82P	C100	1
CC45SL1H030C		C 3P	C144	1
CC45SL1H050C		C 5P	C40,42,85,144	4
CC45SL1H100D		C 10P	C32,86,110	3
CC45SL1H101J		C 100P	C12,41,92,94, 114,133,143	7
CC45SL1H120J		C 12P	C84	1
CC45SL1H150J		C 15P	C43,112	2
CC45SL1H151J		C 150P	C140	1
CC45SL1H221J		C 220P	C93,107	2
CC45SL1H270J		C 27P	C24,26	2
CC45SL1H470J		C 47P	C211	1
CC45SL1H560J		C 56P	C25	1
CC45SL1H680J		C 68P	C108	1
CC45TH1H120J		C 12P	C6	1
CC45TH1H150J		C 15P	C54	1
CC45TH1H270J		C 27P	C53,58	2
CC45UJ1H030C		C 3P	C5,17	2
CC45UJ1H120J		C 12P	C4	1
CC45UJ1H180J		C 18P	C39	1
CC45UJ1H220J		C 22P	C82,106,213	3
CC45UJ1H221J		C 220P	C105	1
CC45UJ1H270J		C 27P	C126	1
CC45UJ1H330J		C 33P	C139	1

PARTS LIST

Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1A101M		E 100 10V	C48,79,118,119,175	5
CE04W1A470M		E 47 10V	C75,147,151,163	4
CE04W1H010M		E 1 50V	C148,174	2
CE04W1H3R3M		E 3.3 50V	C150	1
CE04W1HR47M		E 0.47 50V	C129,195,196,149	4
CK45B1H102K		C 0.001	C34,155,158–162,202,205,212	10
CK45B1H222K		C 0.0022.	C52,80	2
CK45B1H471K		C 470P	C132,142	2
CK45F1H103Z		C 0.01	C1,7–11,13–15,19–23,27,35,37,44,45,59–65,69–72,81,87–89,91,95,102,103,104,109,111,113,123,125,128,130,131,134,137,138,141,145,146,165–173,177,180–194,200,201,206,209,210	83
CK45F1H223Z		C 0.022	C197	1
CQ92M1H102K		ML 0.001	C50	1
CQ02M1H104K		ML 0.1	C51	1
CQ92M1H152K		ML 0.0015	C76	1
CQ92M1H683K		ML 0.068	C77	1
CQ92M1H822K		ML 0.0082	C154	1
C91-0131-05		C 0.01	C203	1
C91-0456-05		C 0.047	C2,28,46,49,73,74,78,90,96–99,120,121,122,156,164,176,198,199,204,207,208	23
C91-0457-05		C 0.022	C153,157	2
E04-0157-05		Mini pin jack A		1
E23-0046-04		Square terminal		5
E40-0273-05		Mini connector 2P		8
E40-0274-05		Mini connector 2P		1
E40-0373-05		Mini connector 3P		4
E40-0473-05		Mini connector 4P		8
E40-0573-05		Mini connector 5P		4
E40-0673-05		Mini connector 6P		1
E40-0773-05		Mini connector 7P		2
E40-0873-05		Mini connector 8P		1
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7
L32-0198-05		OSC coil	L10	1
L32-0201-05		OSC coil 8.83MHz	T14	1
L32-0639-05		OSC coil	L18	1
L33-0636-05		Choke coil 28μH	L31	1
L33-0663-05	N	Choke coil 1μH	L12	1
L33-0664-05	N	Choke coil 2.7μH	L22	1
L33-0665-05	N	Choke coil 39μH	L23	1
L34-2140-05	N	Tuning coil 9.67MHz	T10	1
L34-2141-05	N	Tuning coil 9MHz	T12,13	2
L34-3064-05	N	BPF coil 43MHz	T1,3,4,6	4
L34-3065-05	N	BPF coil 43MHz	T2	1
L34-3066-05	N	BPF coil 34MHz	T5	1

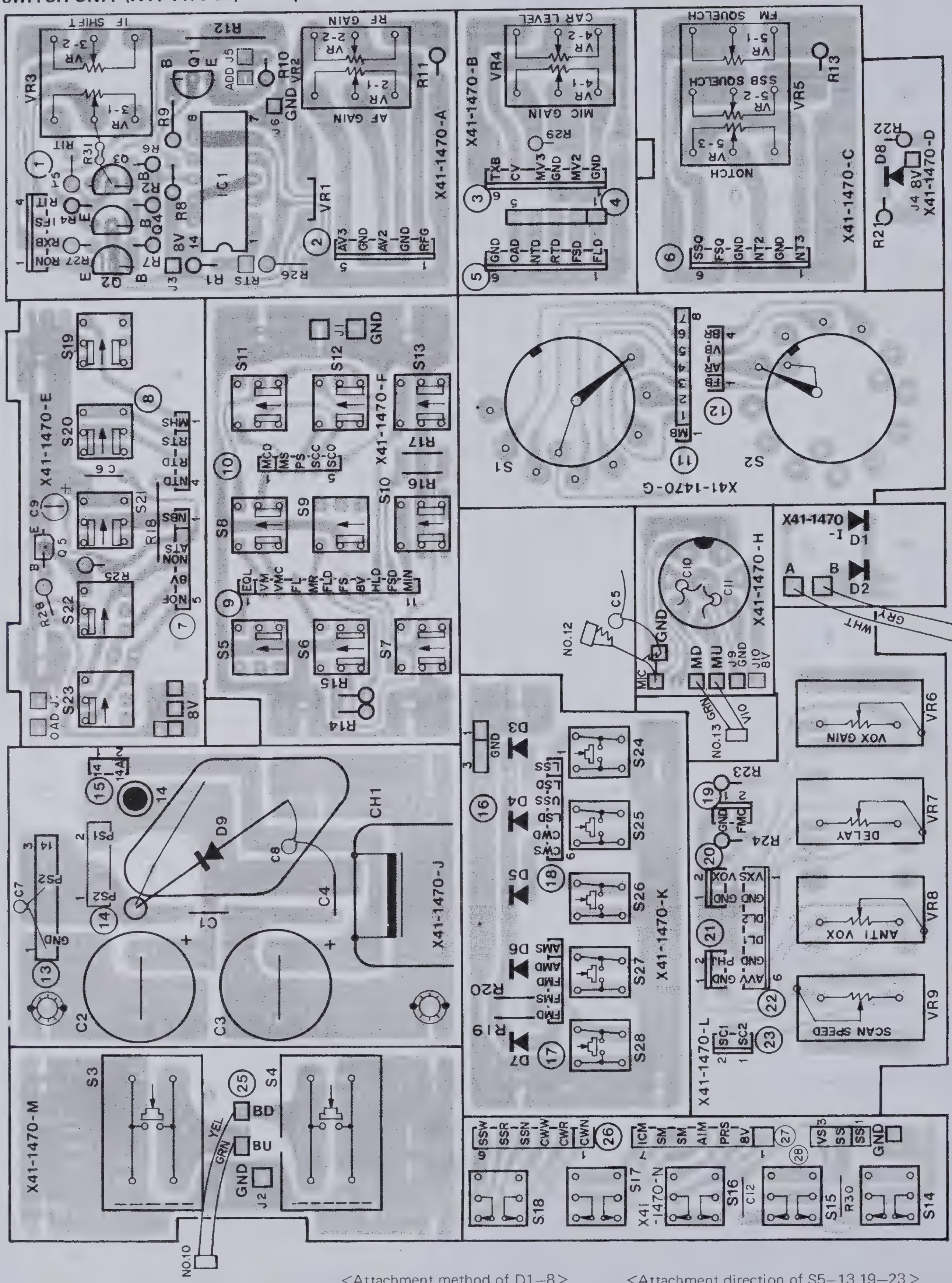
Part No.	Re-marks	Description	Ref. No.	Q'ty
L34-3067-05	N	BPF coil 42.5MHz	T7,9	2
L34-3068-05	N	BPF coil 42.5MHz	T8	1
L40-1011-03		Ferri-inductor 100μH	L1,4–7,11,13–15,17,27,35	12
L33-0672-05		Ferri-inductor 100μH	L36–41	6
L40-1011-04		Ferri-inductor 100μH	L25,26	2
L40-1021-03		Ferri-inductor 1mH	L8,9	2
L40-1511-03		Ferri-inductor 150μH	L34,43	2
L40-2201-03		Ferri-inductor 22μH	L2,3,42	3
L40-2211-03		Ferri-inductor 220μH	L16,19,20,24,30,32,33	7
L40-4711-03		Ferri-inductor 470μH	L21,28,29	3
L72-0336-05	N	Ceramic filter 9.65MHz	CF1	1
L77-0485-05		Crystal 8.8315MHz	X2	1
L77-0486-05		Crystal 8.8285MHz	X1	1
L77-0978-05	N	Crystal 36MHz	X4	1
L77-0979-05	N	Crystal 39.225MHz	X5	1
L77-0980-05	N	Crystal 8.7915MHz	X3	1
L77-0981-05	N	Crystal 9MHz	X6	1
L78-0005-05		Ceramic OSC 5.75MHz	X7	1
R12-1038-05		Trim. pot. 1kΩ	VR1,2	2
R12-1040-05		Trim. pot. 4.7kΩ	VR3	1
R90-0515-05		Resistor block 10kΩ x 4	RB1	1
R90-0561-05	N	Resistor block 22kΩ x 6	RB3	1
R90-0562-05	N	Resistor block 22kΩ x 8	RB2	1
R92-0150-05		Short jumper		94
S31-1005-05		Slide switch	S1	1

DISPLAY UNIT (X54-1710-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W0J221M		E 220 6.3V	C2	1
CE04W1A470M		E 47 10V	C1	1
CE04W1V100M		E 10 35V	C3,5–7	4
CQ92M1H103K		ML 0.01	C4	1
C91-0456-05		C 0.047	C8	1
E40-0273-05		Mini connector 2P		1
E40-0473-05		Mini connector 4P		1
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		1
L19-0305-05		OSC transf.	T1	1
L40-1011-04		Ferri-inductor 100μH	L1	1
L40-1511-03		Ferri-inductor 150μH	L2	1
N30-2604-46		Round screw 2.6 x 4		6
N87-3006-46		Self tapping screw 3 x 6		2
R90-0511-05		Resistor block 47kΩ x 8	RB1	1
R90-0521-05		Resistor block 47kΩ x 7	RB2	1
R92-0150-05		Short jumper		11

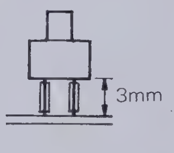
TS-430S PC BOARD VIEW

SWITCH UNIT (X41-1470-00) Component side view

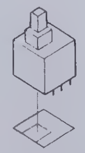


Q1–4 : 2SC945(R) Q5 : 2SC1815(Y)
D1,2,6–8 : SY438D D3–5 : SG238D D9 : S31C(S)
IC1 : TC4011BP

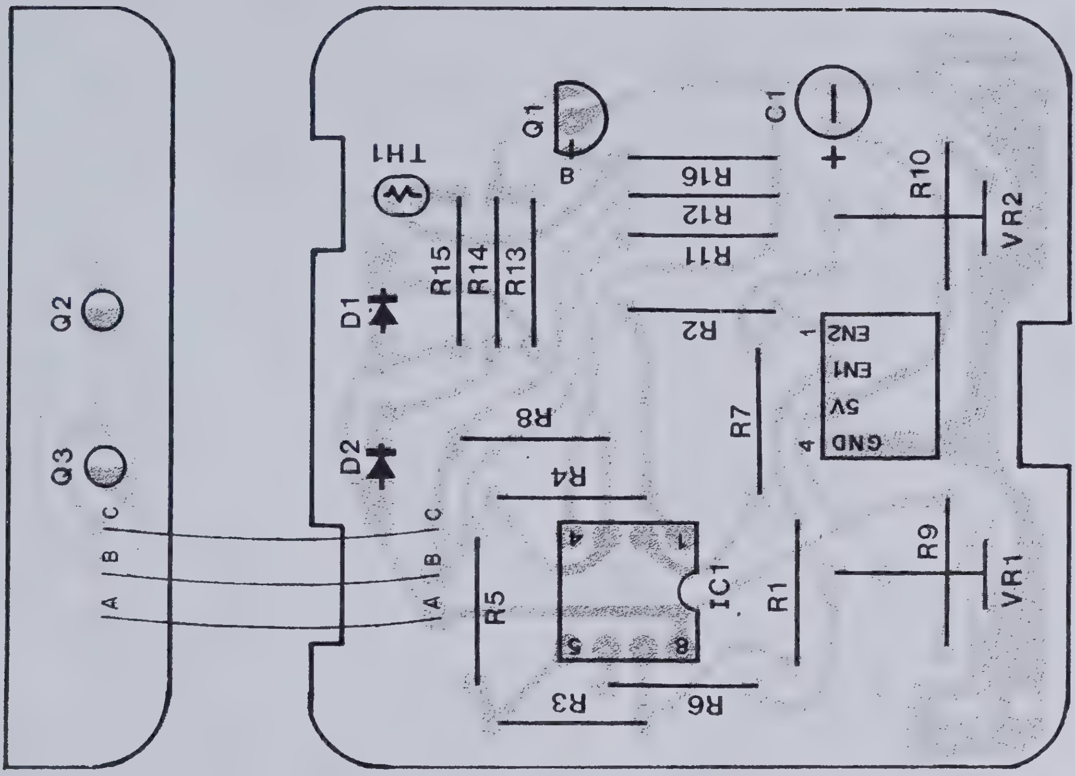
<Attachment method of D1–8>



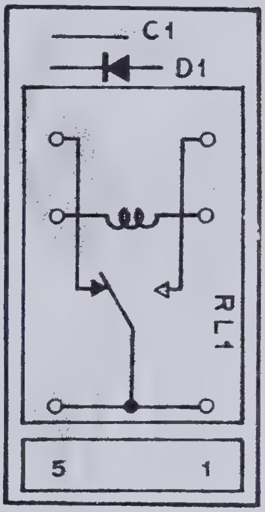
<Attachment direction of S5–13,19–23>



ENCODER ASS'Y (J25-3141-04) Component side view



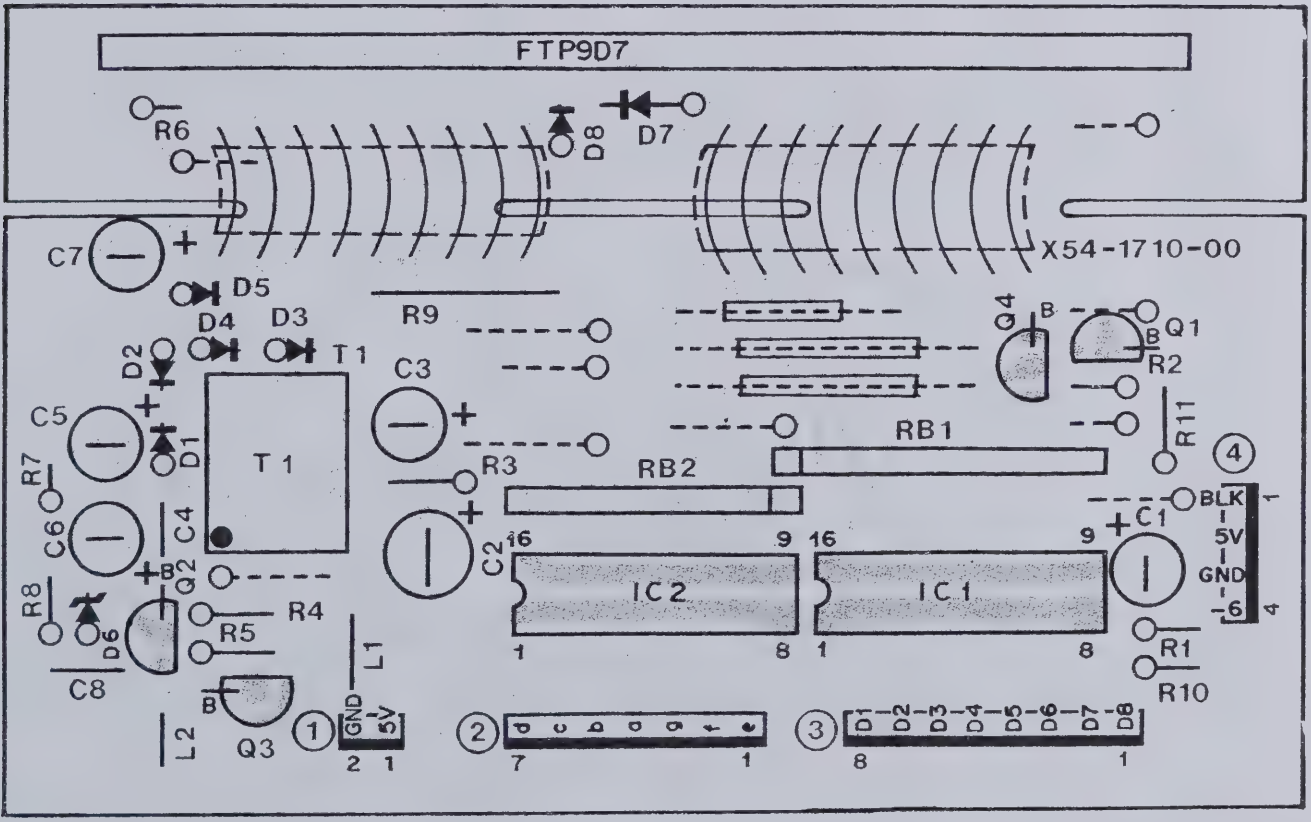
RELAY BOARD Component side view



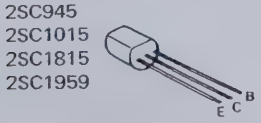
Q1 : 2SA1015(Y) Q2,3 : PN126S
D1,2 : LN66(R)
IC1: LM358P

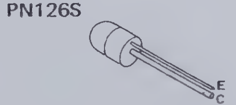
D1 : 1S1555

DISPLAY UNIT (X54-1710-00) Component side view



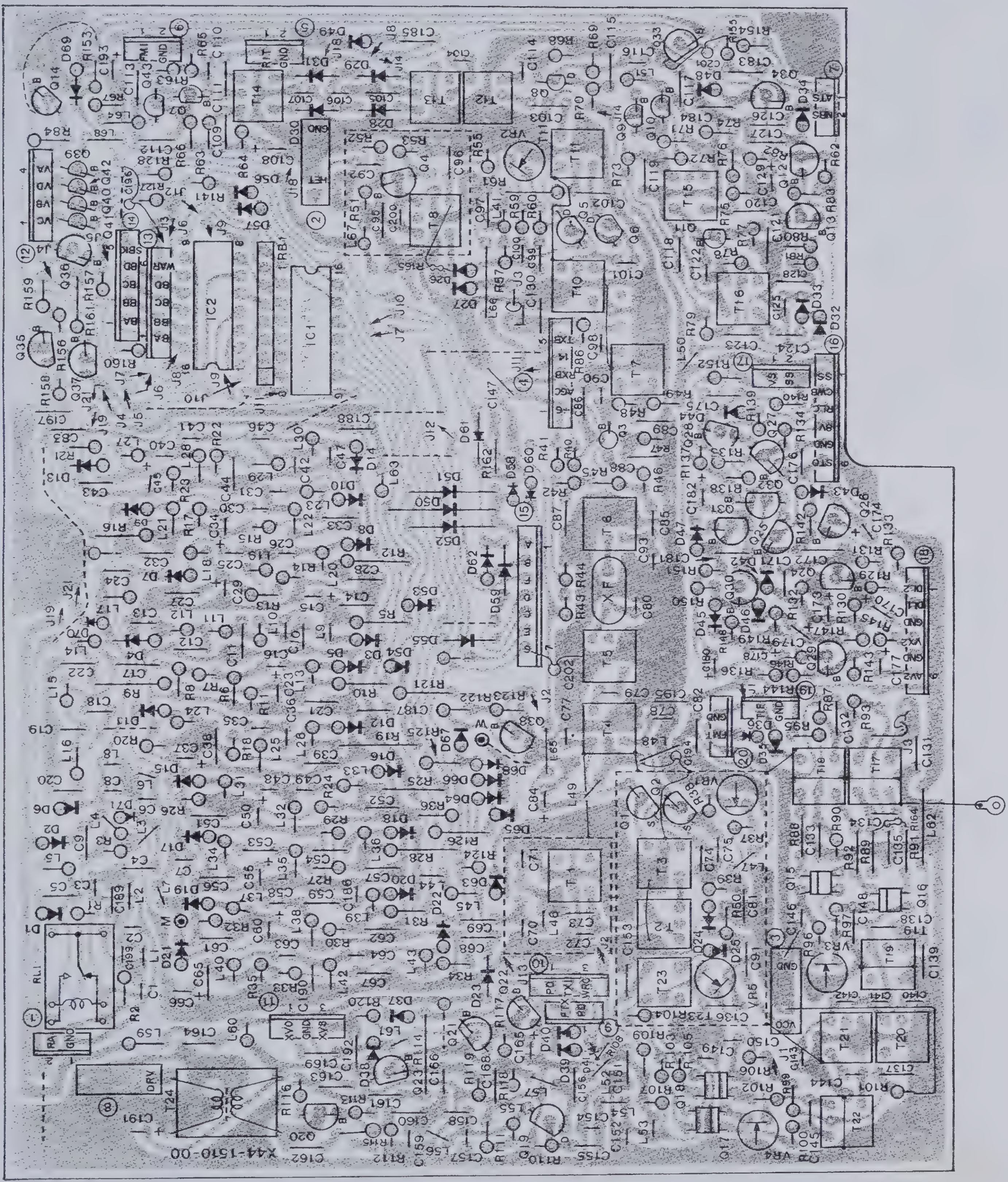
Q1,4 : 2SA1015(Y) Q2,3 : 2SC1959(Y)
D1–4,7,8 : 1S1555 D5 : RD9.1EB2 D6 : RD6.2EB2

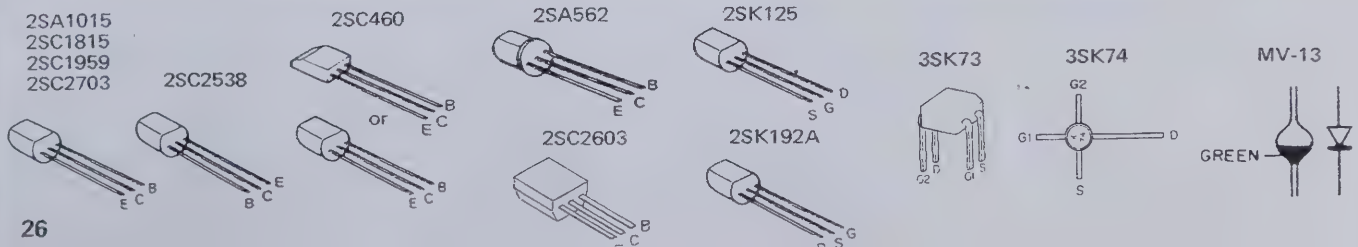




TS-430S PC BOARD VIEW

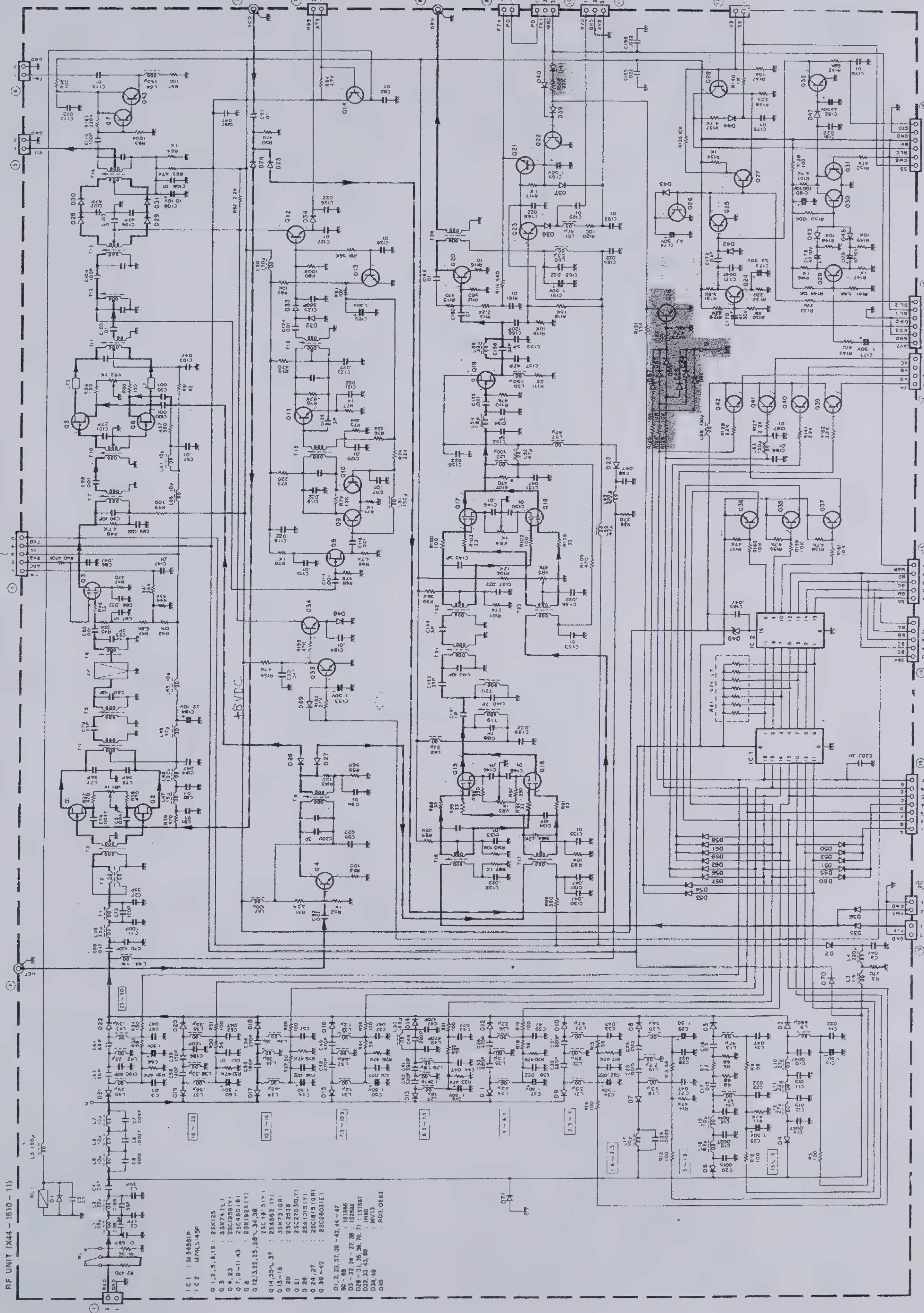
RF UNIT (X44-1510-11) Component side view





CIRCUIT DIAGRAM TS-430S

RF UNIT (X44-1510-11)



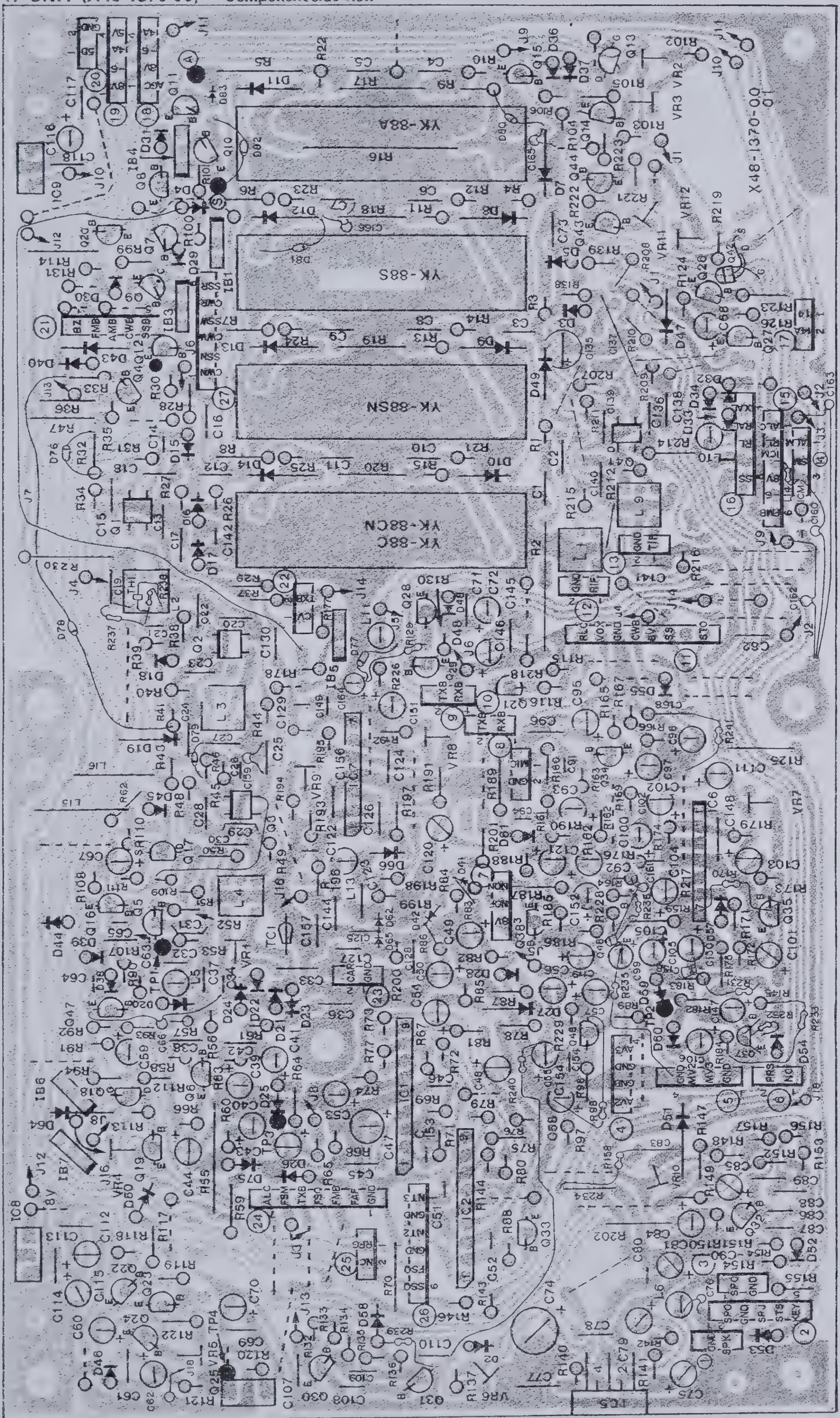
IC 1 : M54561P
IC 2 M74LS145P

Q 1, 2, 5, 6, 19 : 2SK125
Q 3 : 3SK74 (L)
Q 4, 23 : 2SC1959 (Y)
Q 7, 9 ~ 11, 43 2SC460 (B)
Q 8 : 2SK192A (Y)
Q 12, 13, 22, 25, 28 ~ 34, 38 2SC1815 (Y)
Q 14, 35 ~ 37 : 2SA562 (Y)
Q 15 ~ 18 : 3SK73 (GR)
Q 20 : 2SC2538
Q 21 2SC2703 (O, Y)
Q 26 : 2SA1015 (Y)
Q 24, 27 : 2SC1815 (GR)
Q 39 ~ 42 : 2SC2603 (E)

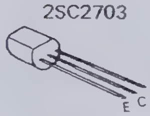
D1, 2, 23, 37, 39 ~ 42, 44 ~ 47
50 ~ 68 : 1S1555
D3 ~ 22, 24 ~ 27, 38 : 1S2588
D28 ~ 31, 35, 36, 70, 71 : 1S1587
D32, 33, 43, 69 : 1N60
D34, 48 : MV13
D49 RD3.0EB2

TS-430S PC BOARD VIEW

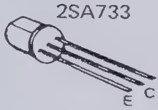
IF UNIT (X48-1370-00) Component side view



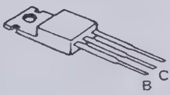
2SA1015
2SC945
2SC1815
2SC2240
2SC2703



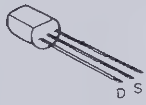
2SA562
2SA733



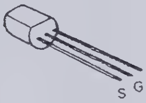
2SD880



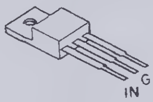
2SK192A



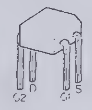
2SK30A



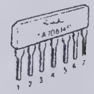
AN7805
AN7808



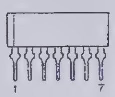
3SK73



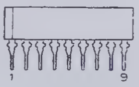
μPC1158H2



AN612



AN6551



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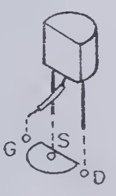

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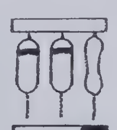
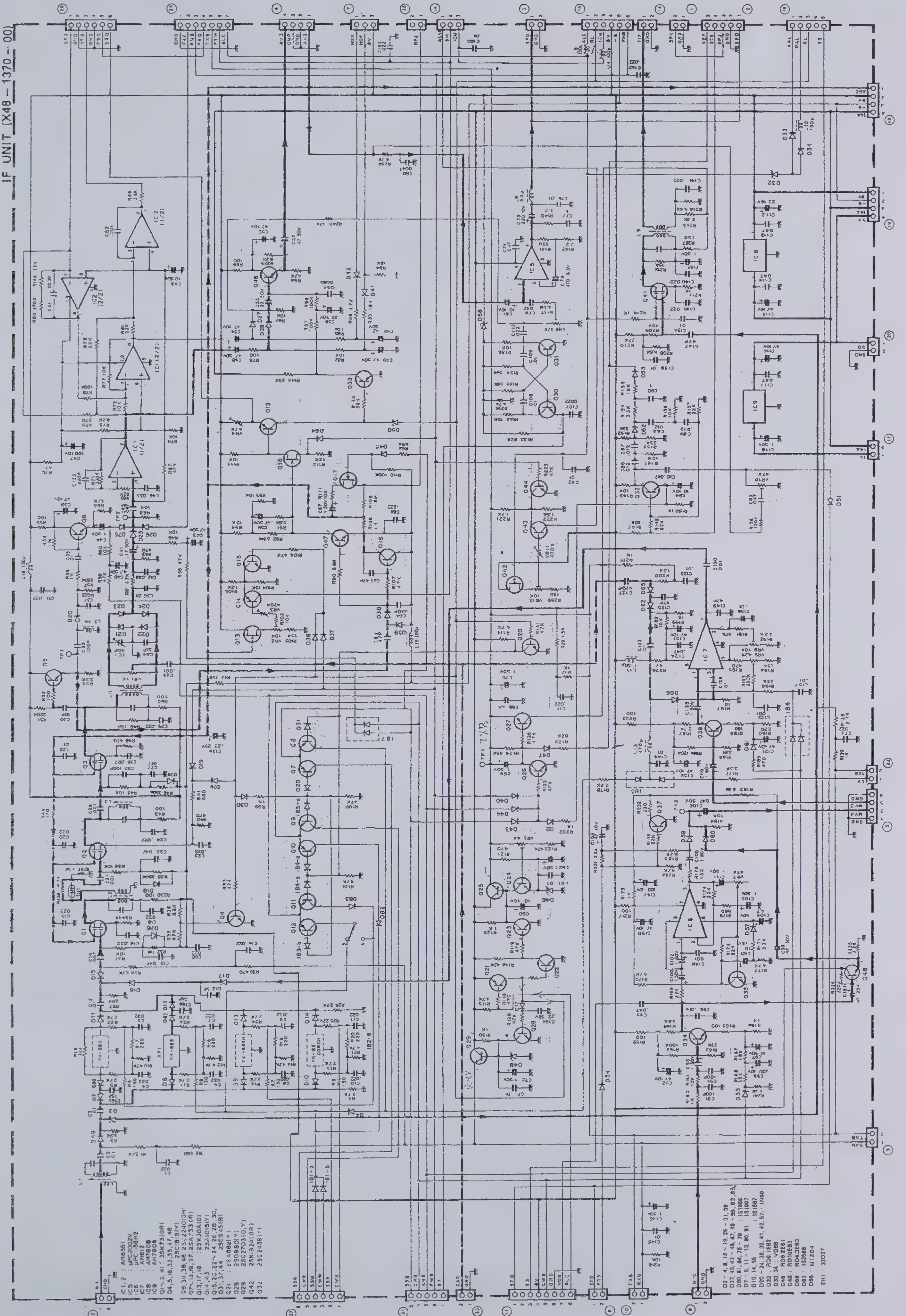


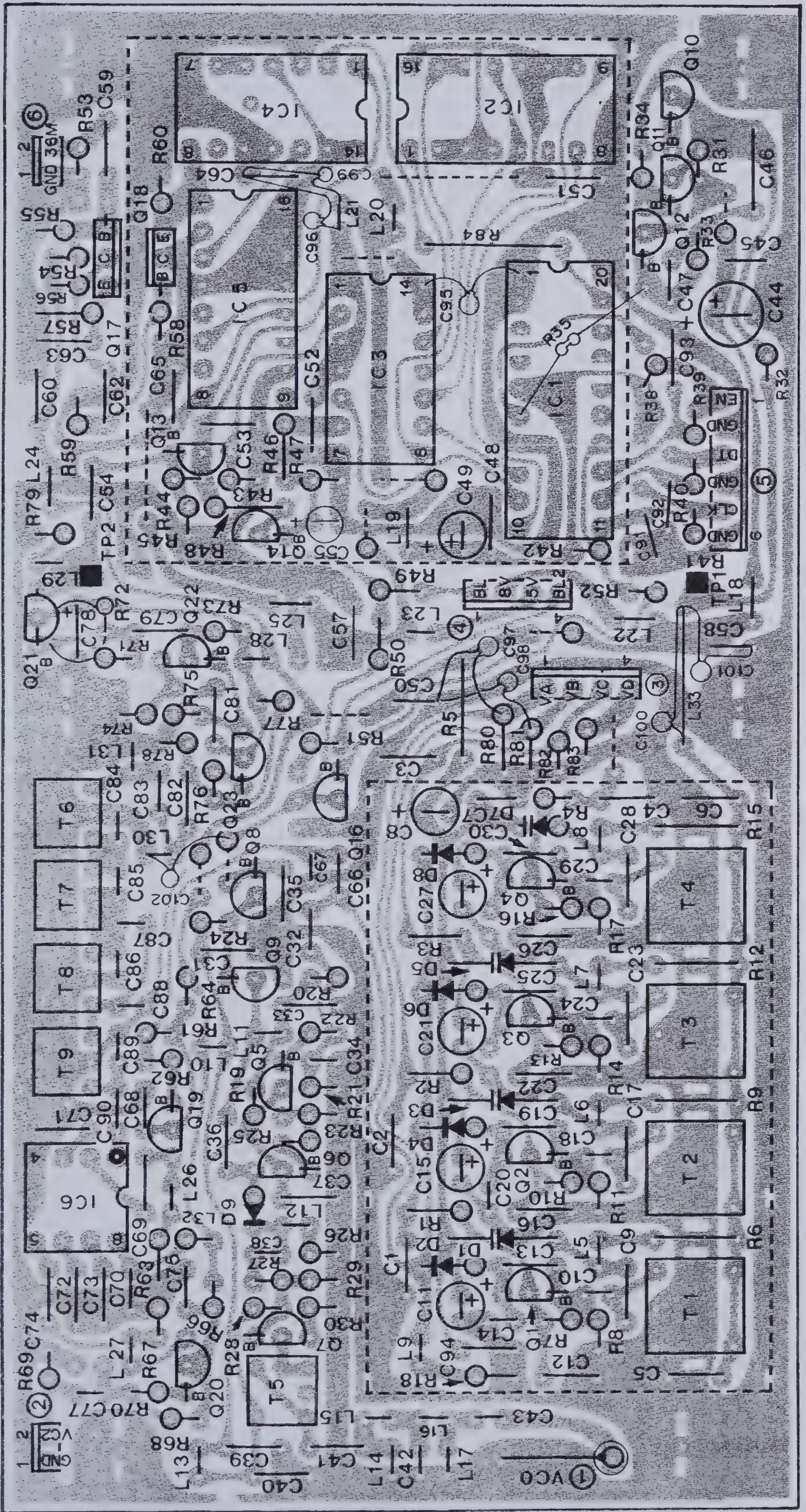
CIRCUIT DIAGRAM TS-430S

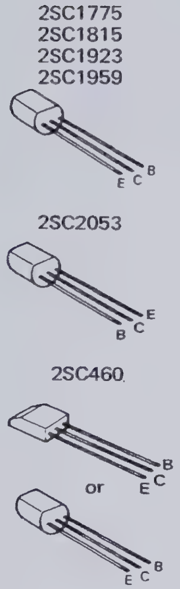
IF UNIT (X48-1370-00)



TS-430S PC BOARD VIEW

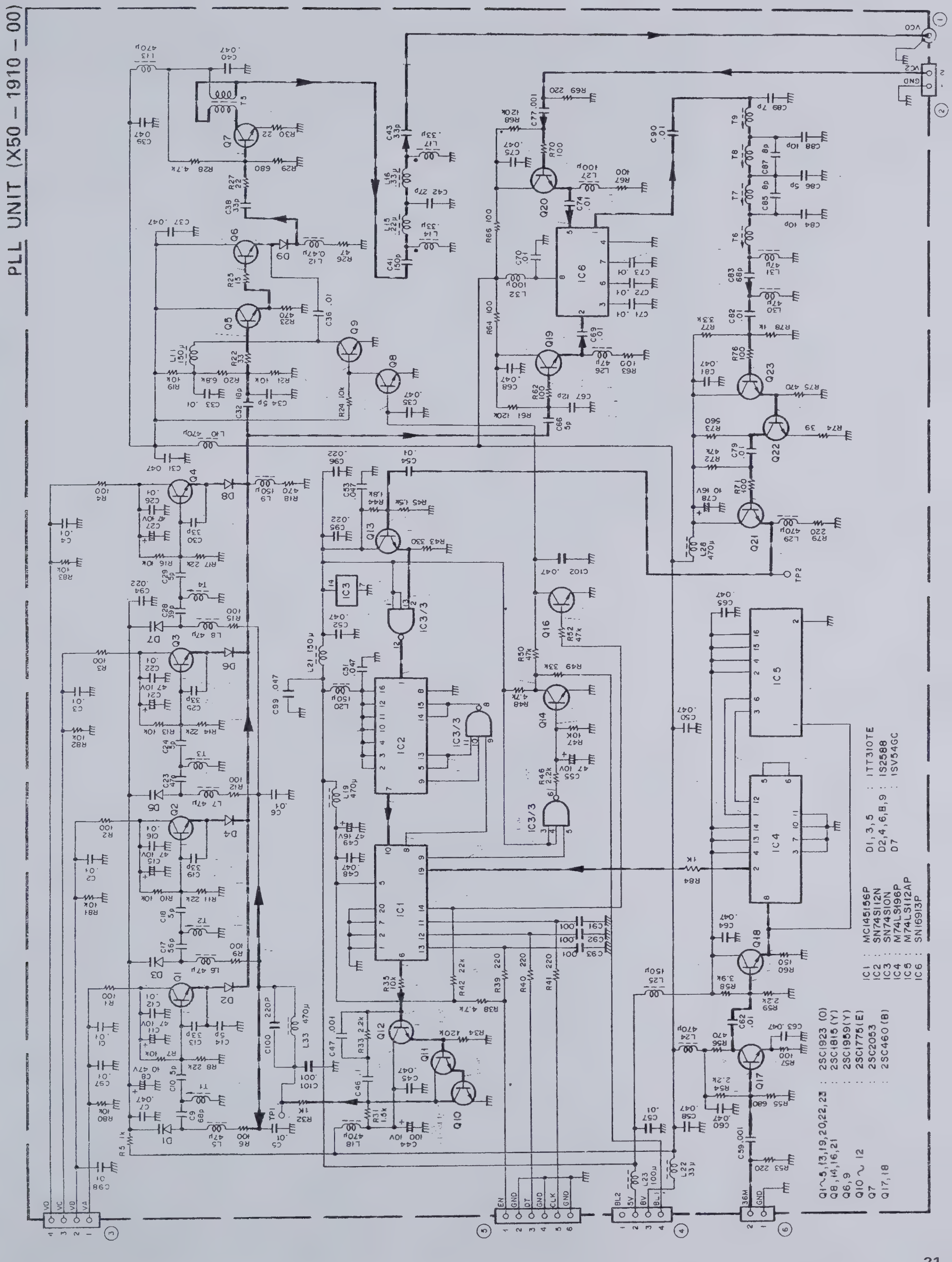
PLL UNIT (X50-1910-00) Component side view





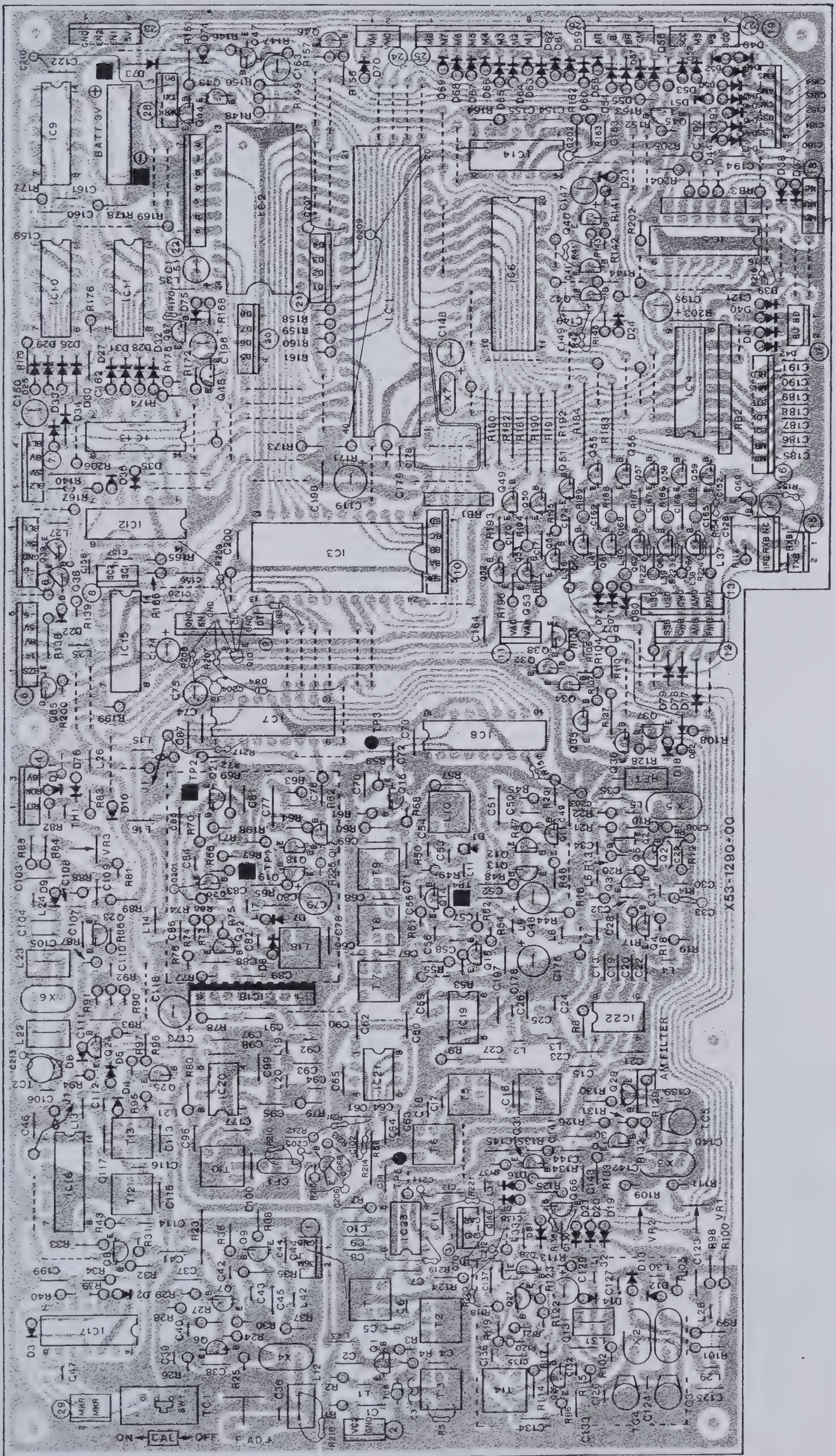
CIRCUIT DIAGRAM **TS-430S**

PLL UNIT (X50-1910-00)

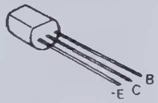


TS-430S PC BOARD VIEW

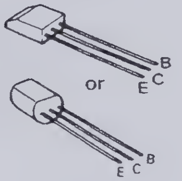
CONTROL UNIT (X53-1290-00) **Component side view**



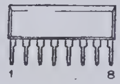
2SA1015
2SC945
2SC1775
2SC1815
2SC1923
2SC1959



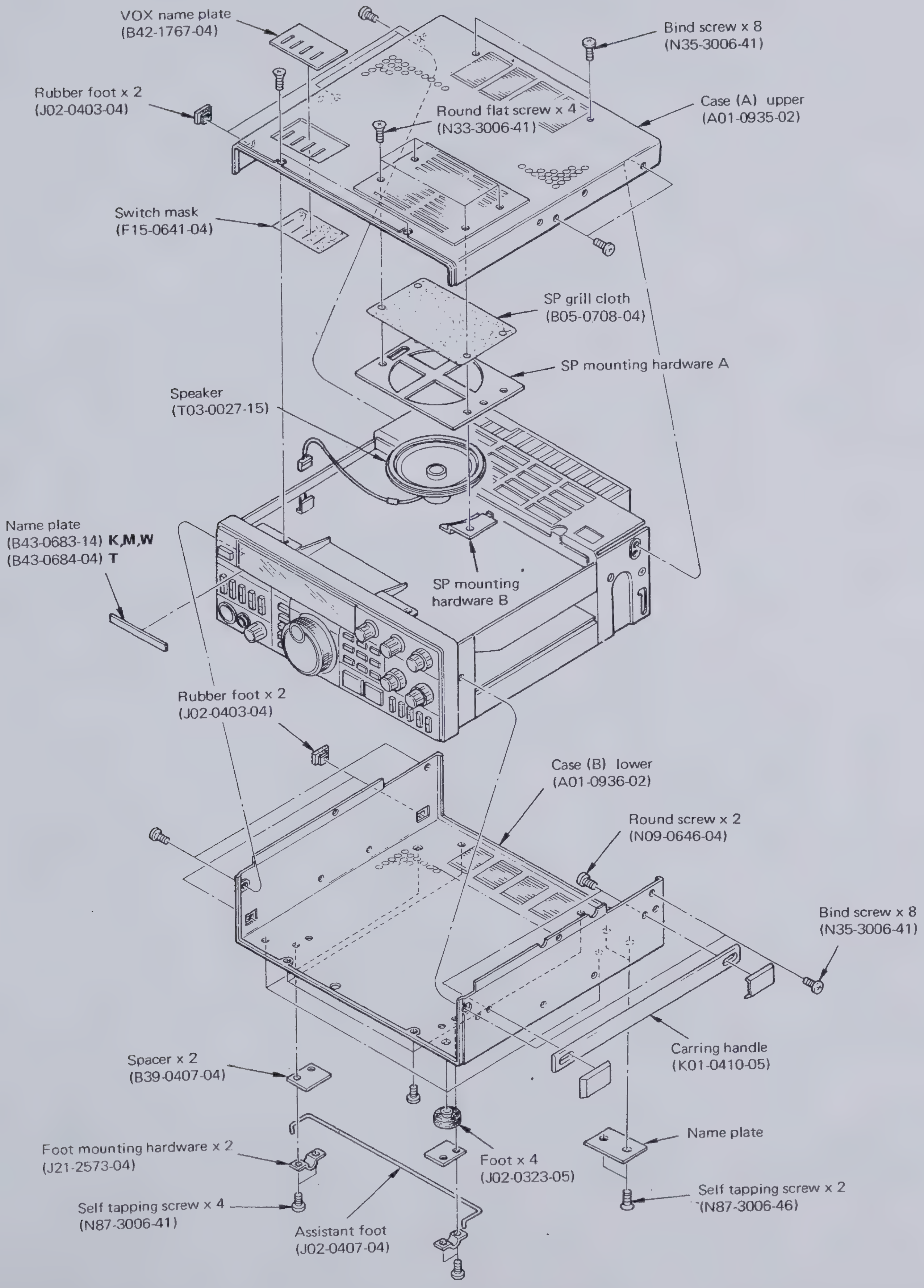
2SC460



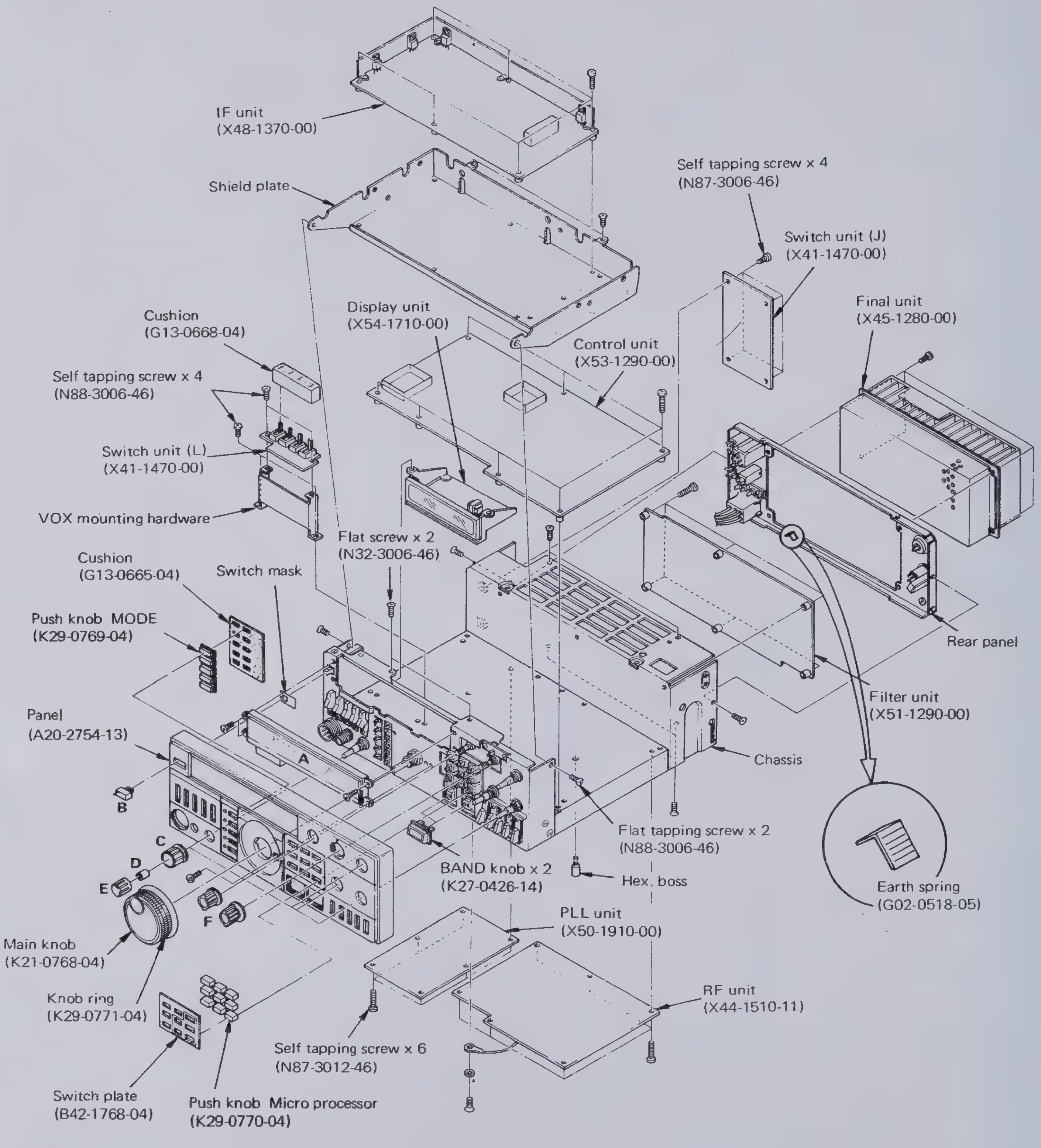
M54459L



DISASSEMBLY



DISASSEMBLY



A Meter
(B31-0639-05)

B Push knob POWER
(K29-0758-04)

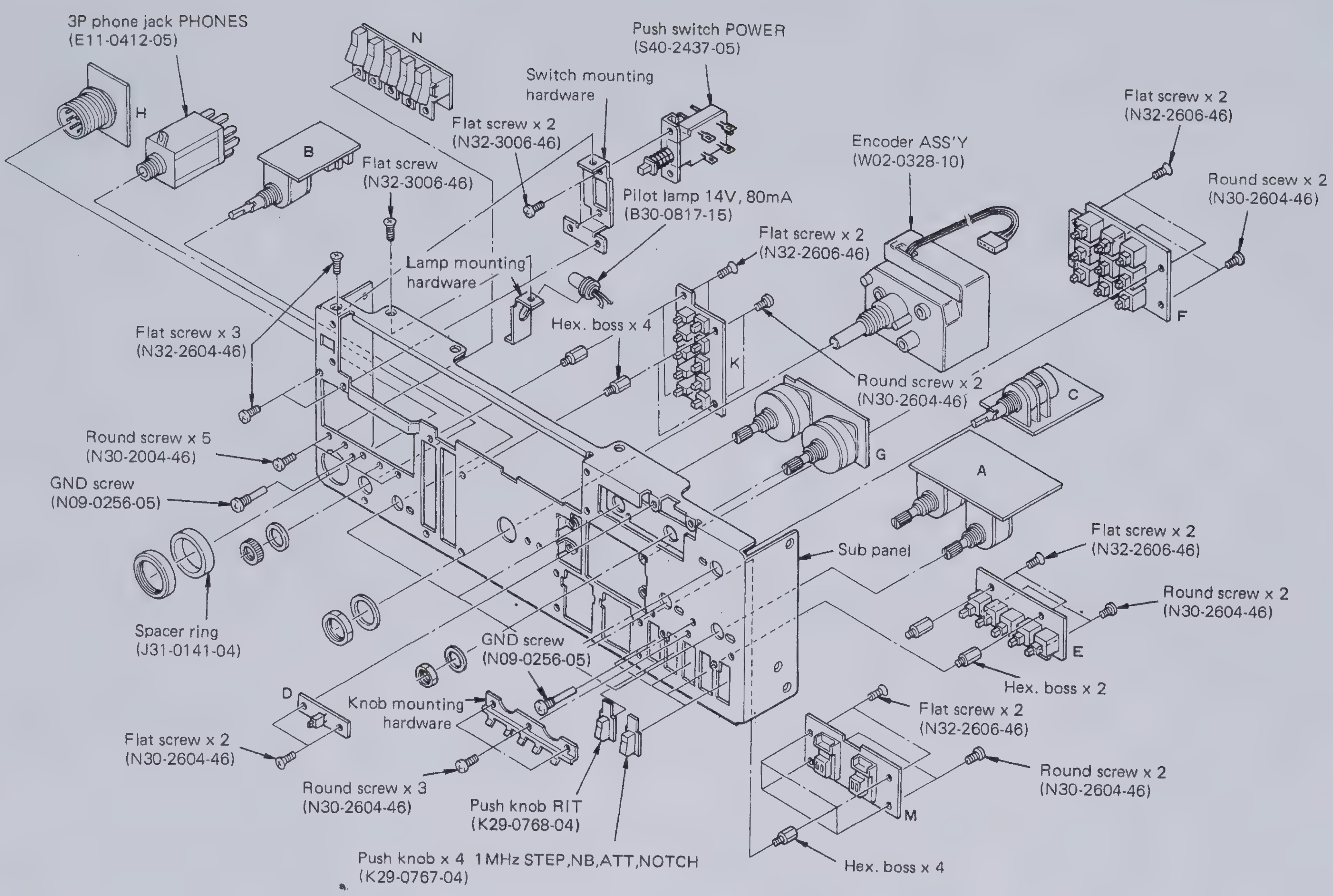
C Knob (outside) x 4 RF,CAR,SQL,IF SHIFT
(K29-0741-24)

D Knob fixed spring x 4
(G02-0505-05)

E Knob (inside) x 4 AF,MIC,NOTCH,RIT
(K23-0710-04)

F Pointer knob x 2 FUNCTION,M.CH
(K23-0753-04)

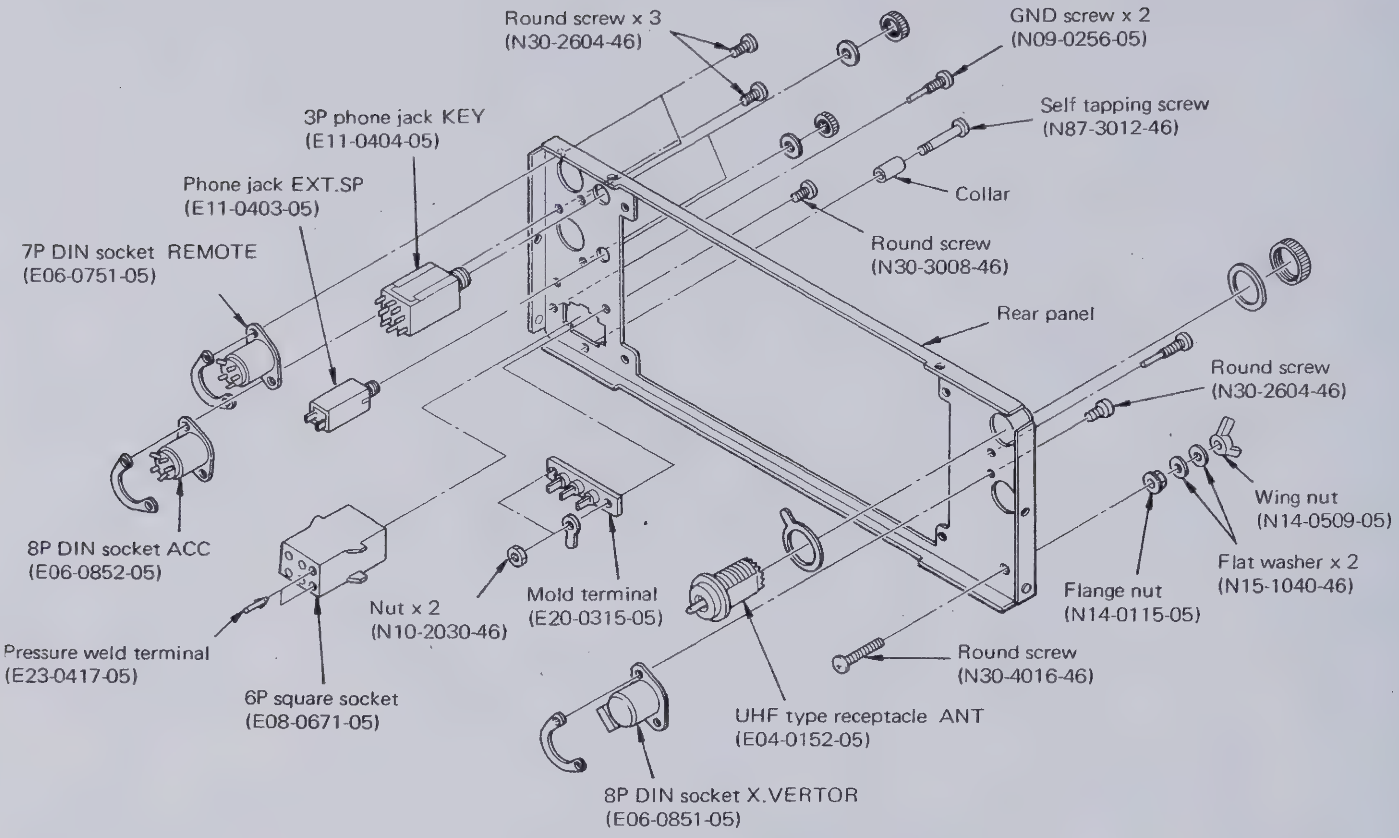
DISASSEMBLY



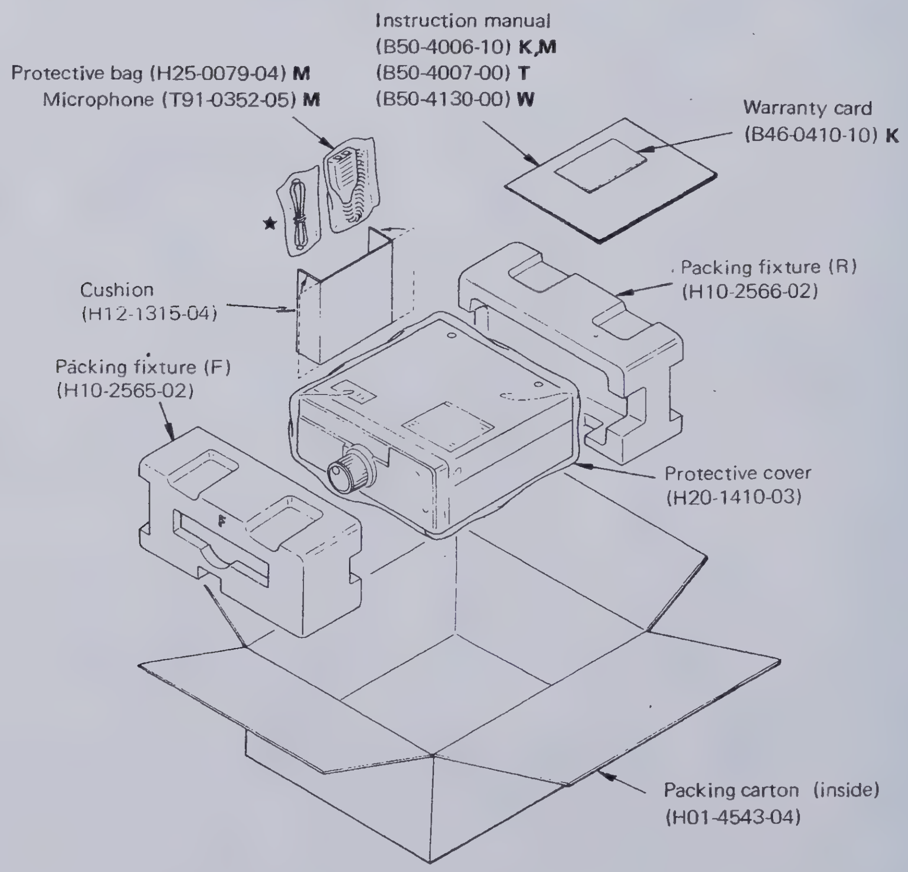
SWITCH UNIT A~N

A	VR2	(R19-3416-05)	Pot. AF/RF
	VR3	(R19-3417-05)	Pot. RIT/IF SHIFT
B	VR4	(R19-3415-05)	Pot. MIC/CAR
C	VR5	(R24-9403-15)	Pot. NOTCH/SQL
D	D8	(SY438D)	LED M.CH
E	S19–23	(S40-2440-15)	Push knob 1MHz STEP, RIT, NB, ATT, NOTCH
F	S5,9,10	(S40-2441-15)	Push knob A=B, MR, M.IN
	S6–8,11–13	(S40-2441-15)	Push knob LOCK, STEP, M.CH, MS, PG.S, HOLD
G	S1	(S29-1428-05)	Rotary switch M.CH
	S2	(S29-1427-05)	Rotary switch FUNCTION
H	–	(E06-0853-05)	8P metal socket MIC
K	S24–28	(S50-1411-05)	Tact switch MODE
	D3–5	(SG238D)	LED LSB, USB, CW
	D6,7	(SY438D)	LED AM, FM
M	S3,4	(S50-1409-05)	Tact switch BAND
N	S14,15	(S36-2408-05)	Paddle switch SEND/REC, VOX/MAN
	S16–18	(S36-2411-05)	Paddle switch PROC, ALC/IC, NAR/WIDE

DISASSEMBLY/PACKING



PACKING

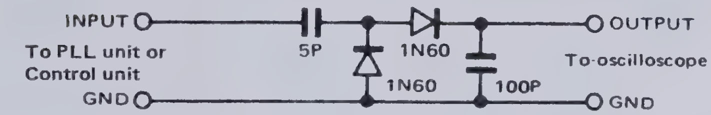


★Protective bag (H25-0112-04)
  DC cord (E30-1638-05)
  Protective bag (H25-0116-04)
    7P DIN plug (E07-0751-05)
    8P DIN plug (E07-0851-05)
    Phone plug (E12-0001-15)
    CAL cord (E31-2154-04)
    Fuse 20A (F05-2034-05)

ADJUSTMENT

REQUIRED TEST EQUIPMENT

1. **DC Voltmeter (DC V.M)**
   1) Input resistance : More than 1MΩ
   2) Voltage range : 1.5 to 1000V AC/DC
   NOTE : A high-precision multimeter may be used. However, accurate readings can not be obtained for high-impedance circuits.
2. **DC Ammeter**
   1) Current range : 1.5A, 3A, 20A, High-precision ammeter may be used.
3. **RF VTVM (RF V.M)**
   1) Input impedance : 1MΩ and less than 3pF, min.
   2) Voltage range : 10mV to 300V
   3) Frequency range : 10kHz to 100MHz or greater
4. **AF Voltmeter (AF V.M)**
   1) Frequency range : 50Hz to 10kHz
   2) Input resistance : 1MΩ or greater
   3) Voltage range : 10mV to 30V
5. **AF Generator (AG)**
   1) Frequency range : 200Hz to 5kHz
   2) Output : 1mV or less to 1V, low distortion
6. **AF Dummy Load**
   1) Impedance : 8Ω
   2) Dissipation : 3W or greater
7. **Oscilloscope**
   Requires high sensitivity, and external synchronization capability.
8. **Sweep Generator**
   1) Center frequency : 50kHz to 90MHz
   2) Frequency deviation : Maximum±35MHz
   3) Output voltage : 0.1V or greater
9. **Standard Signal Generator (SSG)**
   1) Frequency range : 50kHz to 50MHz
   2) Output : –20dB/0.1μV to 120dB/1V
   3) Output impedance : 50Ω
   4) AM and FM modulation can be possible.
   NOTE : Generator must ve frequency stable.
10. **Frequency Counter (f. counter)**
    1) Minimum input voltage : 50mV
    2) Frequency range : 50MHz or greater
11. **Noise Generator**
    Must generate ignition noise containing harmonics beyond 30MHz.
12. **RF Dummy Load**
    1) Impedance : 150Ω
    2) Dissipation : 150W or greater
13. **Power Meter**
    1) Impedance : 50Ω
    2) Dissipation : 150W cintinuous or greater
    3) Frequency limits : 60MHz or greater
14. **Spectrum Analyzer**
    1) Frequency range : 100kHz to 110MHz or greater
    2) Bandwidth : 1kHz to 3MHz
15. **Detector**
    1) For adjustment of PLL/VCO BPF



16. **Directional Coupler**
17. **Power supply**
    PS-430
18. **Microphone**
    MC-60A or MC-42S

PREPARATION

Unless otherwise specified, set the controls as follows.

POWER	ON	NAR/WIDE	WIDE
BAND	14	1MHz STEP	OFF
AF	MIN	RIT SW	OFF
RF	MAX	NB SW	OFF
MIC	MIN	ATT SW	OFF
CAR	MIN	NOTCH SW	OFF
NOTCH	CEN	MODE	USB
SQUELCH	MIN	LOCK SW	OFF
MEMORY.CH.	1	STEP SW	OFF
FUNCTION	A	M.CH SW	OFF
SEND/REC	REC	MS SW	OFF
VOX/MAN.	MAN	PG.S	OFF
PROCESSOR SW	OFF	HOLD	OFF

< REFERENCE >

Japanese "SG"	American "SG"
–6dB	0.25μV
0dB	0.5μV
6dB	1μV
12dB	2μV
24dB	8μV
30dB	15.8μV
40dB	50μV
50dB	158μV
60dB	500μV
70dB	1.58mV
80dB	5mV
90dB	15.8mV
100dB	50mV
120dB	0.5V

ADJUSTMENT

VOLTAGE CHECK, ADJUSTMENT

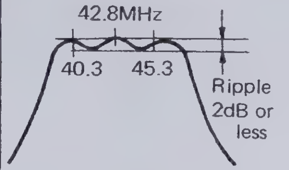
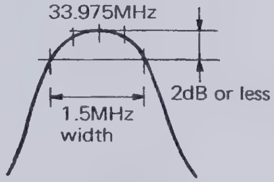
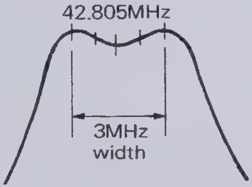
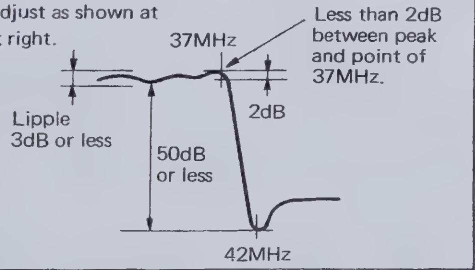
Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Voltage	1) POWER : ON RF GAIN : MAX MODE : USB STBY : REC	DC V.M	IF	⑲-1			Check	7.4–8.4V
				⑲-4				4.75–5.25V
				⑲-2				–5.8 – –6.3V
				⑨-1				8.3–9.1V
				⊕(BATT)				3.0V or more
				㉕-1	SW"A"	VR1	2.6V***1** or 2.8V***2**	+0.05V,–0V
	2) STBY : SEND			TP4	IF	VR5	8.8V	±0.1V

IF UNIT Q1–3,41 : 3SK73(GR)*1
3SK73(BL)*2

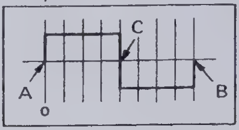
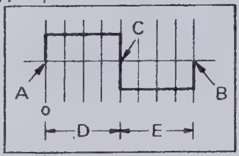
PLL ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Reference oscillator frequency	1) 36MHz	f. counter	Cont	①-2	Cont	TC1	36,000,000Hz	±10Hz
	2) HET (39.225MHz)			HET			Check	39,224,500–39,225,500Hz
2. RIT	1) RIT Pot. : CEN RIT SW : ON STBY : REC	f. counter	Cont	D5 cathode	Cont	TC2	9,000,000Hz	±50Hz Use oscilloscope's probe.
	2) RIT Pot. : Full CW (+)						Verify	8,990,000Hz or less
	RIT Pot. : Full CCW (–)							9,010,000Hz or more
	3) MODE : CW STBY : SEND					VR3	8,992,000Hz	±10Hz
3. CAR	1)	RF VTVM	Cont	③-2	Cont	T14	0.28V (Turn core out from peak)	
	2) MODE : USB IF SHIFT Pot. :CEN STBY : REC	f. counter				TC4	8,831,500Hz	±10Hz *
	STBY : SEND					VR2	No change in freq.	±10Hz
	3) IF SHIFT Pot. : Full CW STBY : REC	* Note : This is an initial adjustment only. You must also perform dyrp 10 of the TX adjustment if you adjust TC3 and or TC4.					Verify	8,832,400Hz or more
	IF SHIFT Pot. : Full CCW							8,830,600Hz or less
	4) MODE : LSB IF SHIFT Pot. : Centerd STBY : REC					TC3	8,828,500Hz	±10Hz*
	5) MODE : CW STBY : SEND					VR1	8,830,700Hz	±10Hz
	6) MODE : FM STBY : SEND					TC5	8,791,500Hz	±10Hz
	7) MODE : AM						Verify	8,789,850–8,790,150Hz
4. VCO-1 (Voltage control oscillator)	1) FREQ : □□,□□0.0kHz To obtain this frequency 1st set dial to □9.9□. Then using mic push button depress UP button one step. (10Hz/step obtained by mic UP or DOWN button).	DC V.M	Cont	TP1	Cont	L18	6.0V	±0.1V
	2) FREQ : □□,□□9.9[9]kHz To obtain this frequency 1st set dial to □0.0[0]. Then depress mic up or down button one step.						Verify	2.1V±0.5V
5. PLL 9MHz IF	1) RIT SW : OFF	RF VTVM	Cont	IC20-5	Cont	T12,13	MAX	(150mV)
6. PLL 9.65MHz IF	1) FREQ : □□,□□5.0kHz RIT SW : OFF	RF VTVM	Cont	Q68-C	Cont	T10	MAX	(160mV)

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
7. PLL 42.8MHz BPF	1) Connect a 0.01μF capacitor between Q14 Base and GND. (To stop oscillation) Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscillo-scope	Cont TP3	IC21-5	Cont	T7,8,9	Adjust as shown at right.	
8. PLL 33.975MHz BPF	1) Connect a 0.01μF capacitor between Q14 Base and GND. (Stop oscillation) Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscillo-scope	Cont TP5	IC22-5	Cont	T4,5,6	Adjust as shown at right.	
9. PLL 42.805MHz BPF	1) Disconnect connector ② VC2. Reconnect connector ② after adjustment. Connect a 0.01μF capacitor between D15 cathode and GND. Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscillo-scope	Cont	TP5 ②-2	Cont	T1,2,3	Adjust as shown at right.	
10. VCO-2	1) FREQ : □□,000.0$\boxed{0}$ kHz To obtain this frequency 1st set dial to □,999.9$\boxed{9}$. Then using mic push button depress UP button one step.	DC V.M	Cont	TP4	Cont	L10	6.5V	±0.1V
	2) FREQ : □□,999.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to □,000.0$\boxed{0}$. Then using mic push button depress DOWN button one step.						Check	2.1V±0.5V
11. VC2 level		RF VTVM	Cont	Connector ②	Cont	TC6	50mV	±1dB
12. VCO-BPF	1) Disconnect PLL unit connector ②. Reconnect connector ② after adjustment. Connect 560Ω resistor in Tracking Gen. output line. Use high impedance probe to connect to spectrum analyzer. (or connect 150Ω in seriers)	Tracking Gen. Detector Spectrum analyzer	PLL	IC6-1 TP2	PLL	T6–9	Adjust as shown at at right. 	
13. VCO-3A	1) FREQ : 7,499.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to 7,500.0$\boxed{0}$. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T1	2.1V	±0.1V
	2) FREQ : 0,000.0kHz						Check	6.5V or less
14. VCO-3B	1) FREQ : 15,999.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to 16,000.0$\boxed{0}$. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T2	2.1V	±0.1V
	2) FREQ : 7,500.0$\boxed{0}$ kHz						Check	6.5V or less
15. VCO-3C	1) FREQ : 22,999.9$\boxed{9}$ kHz To obtain this frequency 1st set dial to 23,000.0$\boxed{0}$. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T3	2.1V	±0.1V
	2) FREQ : 16,000.0$\boxed{0}$ kHz						Check	6.5V or less

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
16. VCO-3D	1) FREQ : 29,999.9$\boxed{9}$ kHz Turn VFO to frequency stop.	DC V.M	PLL	TP1	PLL	T4	1.6V	±0.1V
	2) FREQ : 23,000.0$\boxed{0}$ kHz						Check	6.5V or less
17. Encoder	1) Remove the VFO knob and motor-drive the encoder at approx. 300 rpm.	Oscillo-scope	Cont	㉓-3				Point C may be located any-where. When a motor is not available, manually turn the VFO to check the duty ratio.
	2) EN1 duty ratio adjustment : Turn both CW and CCW				Enco-der	VR1		After adjusting with the VFO control turned CW, check that intervals D and E are also indentical when the VFO control is turned CCW.
	3) EN2 duty ratio adjustment : Turn in the both directions.			㉓-2		VR2	Adjust until intervals D and E are equal to each other with point C placed at the center.	

RX ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. IF AMP	1) FREQ : 160.0kHz MODE : LSB RF GAIN Control : MAX	SSG AF V.M	Rear panel	ANT EXT. SP	RF	T8,4–7 10–14 VR2	MAX	S/N 10dB or more at –6dBμ input. 1V or more/8Ω at AF GAIN Control MAX.
	Use the minimum SSG input possible during alingment.	Oscillo-scope AF Dummy load			IF	L1–4		
	2) FREQ : 29,000.0kHz MODE : FM (If FM-430 is installed) SSG : 1kHz audio at 5kHz dev.				FM IF	VR3 T2	MAX	
2. Internal spurious beat	1) FREQ : 500.0kHz RF GAIN Control : Minimum level possible.				RF	VR1	MIN	
3. RX DET Balance	1) RF GAIN Control : MIN	RF VTVM (Oscillo-scope)	IF	TP1	IF	VR1 TC1	MIN	
4. 48.055MHz IF trap	1) FREQ : 24,999.9kHz SSG output : 48.055MHz, 80dB RF GAIN Control : Minimum level as possible	SSG AF V.M	Rear panel	ANT EXT. SP	RF	T1	MIN	70dB or more
5. S meter	1) No signal (SSG output : OFF)	S meter			IF	VR2	Set to starting point. (Meter zero)	
	2) FREQ : 14,175.0kHz MODE : USB SSG output : 14,175.0kHz, 8dB	SSG S meter	Rear panel	ANT		L3	S1 Adjust counter clockwise from peak. (turn slug out).	8.0dB±4dB
	3) SSG output : 40dB					VR3	S9	40dB±6dB (50μV)
	4) FREQ : 29,000.0kHz MODE : FM SSG output : 29,000.0kHz, 30dB (If FM-430 is installed.)				FM IF	VR2	Full scale	30dB±10dB

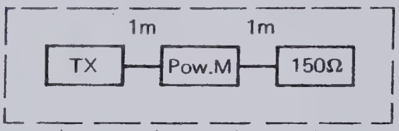
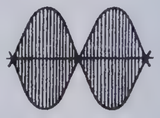
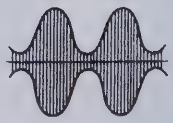
ADJUSTMENT

		Measurement			Adjustment			
Item	Condition	Test equipment	Unit	Terminal	Unit	Part	Method	Specification/Remakrs
6. Squelch threshold	1) MODE : CW NAR/WIDE SW : WIDE SQL control : 12 o'clock	Speaker		EXT. SP	IF	VR4	Adjust VR slowly and stop at threshold.	12 o'clock
7. Noise Blanker	1) FREQ : 14,175.0kHz NB SW : ON SSG output : 14,175.0kHz First adjust 20dB input, then using the minimum input as possible.	SSG DC V.M (Oscilloscope)	Rear panel RF	ANT R82	RF	T15, 16	MIN	
	2) Noise Gen. : Low level	Noise Gen. SP	Rear panel	ANT EXT. SP		T15, 16	MIN noise level.	
8. Beeper	1) AF GAIN control : MIN Jumper connector ⑳ to GND.	AF V.M Oscilloscope AF dummy load		EXT. SP	IF	VR6	50mV/8Ω	

TX ADJUSTMENT

		Measurement			Adjustment			
Item	Condition	Test equipment	Unit	Terminal	Unit	Part	Method	Specification/Remarks
1. IC meter null	1) ALC/IC SW : IC STBY : SEND Disconnect RF and DRV connector. Adjust to minimum current by VR1 and VR2 in Final unit.	S meter			Filter	VR4	Set to S meter "0".	*If this adjustment is performed, step 2.1) Base current must also be performed.
2. Base current	1) MODE : USB MIC LEVEL control : MIN Connect Ammeter ⊕ : EXT power supply ⊕ terminal ⊖ : Power connector ⊕ terminal Adjust to minimum current with VR1 and VR2 in the Final unit. STBY : SEND	Ammeter			Final	VR1	Current drain (Minimum current) +200mA	First adjust VR1 and VR2 for minimum. Adjust VR1 for an increase of 200mA when switched to TX. Then adjust VR2 for 200mA over this reading.
	2) STBY : REC (After adjustment)					VR2	Current drain (Minimum current) + Driver current (200mA)+200mA	
3. TX AMP	1) FREQ : 14,175.0kHz MODE : CW CAR LEVEL control : MAX Disconnect DRV connector from RF unit. Reconnect this connector after adjustment. STBY : SEND	50ΩRF dummy load Oscilloscope	RF	DRV	IF RF	L9 T17–19 VR3, T20–22 VR4,5	MAX	*If this adjustment is performed, step 8. must also be performed. Readjust VR3,4,5 for Min. sprious, step 8).
4. NULL	1) FREQ : 29,900.0kHz MODE : CW CAR LEVEL control : 50–60W output power STBY : SEND	Power meter	Rear panel	ANT	Filter	VR2 TC1	Mechanically set to 9–10 o'clock. MAX	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
5. ALC (RF output power)	1) FREQ : 14,175.0kHz MODE : CW CAR LEVEL control : ALC scale MAX STBY : SEND	Power meter	Rear panel	ANT	Filter	VR1	95W	Caution : In no case should the power be adjusted for greater than 110 watts.
6. Power down	1) FREQ : 28,500.0kHz MODE : CW CAR LEVEL control : ALC scale MAX Connect ACC socket pin ⑥ to GND. STBY : SEND	Power meter	Rear panel	ANT	Filter	VR3	50W	
7. Protection	1) FREQ : 14,300MHz MODE : CW Connect Ammeter ⊕ : EXT power supply ⊕ terminal ⊖ : Power connector ⊕ terminal Adjust at frequency BAND with maximum current drain. Coax. cable to 150Ω dummy load should be 1m long. STBY : SEND	150ΩRF dummy load Ammeter Power neter	Rear panel	ANT	Filter	VR2	30W 	
	2) ANT : OPEN	Am meter						18A or less
8. Spurious	1) FREQ : 21,200.0kHz MODE : CW CAR LEVEL control : ALC scale MAX STBY : SEND	Spectrum analyzer power meter	Rear panel	ANT (Directional coupler)	RF	VR4,5 VR3	MIN/±5.7MHz MIN/±0.36MHz	*If this adjustment is performed, step 3. must also be performed
9. Carrier suppression	1) FREQ : 14,175.0kHz MODES : USB and LSB MIC LEVEL control : MIN STBY : SEND	Oscilloscope	Rear panel	ANT (Directional coupler)	IF	VR8,9	MIN	–40dB or less
10. SSB mode frequency response	1) FREQ : 14,175.0kHz MODES : USB and LSB AG output : Two tone 7mV 300, 2700Hz Set output to 50W using MIC control. STBY : SEND If two tone generator is not available adjust for equal output power at 300, 2700Hz, as measured on wattmeter.	Oscilloscope	Rear panel	ANT (Directioanl coupler)	Cont	TC4 (USB) TC3 (LSB)	Adjust as shown at right.	*If this adjustment is performed, step 9. must also be performed. OK  NG 
11. FM IF (If FM-430 is installed)	1) FREQ : 29,000.0kHz MODE : FM STBY : SEND	RF VTVM	FM IF	D2 cathode	FM IF	T1	MAX	
12. Deviation (If FM-430 is installed)	1) FREQ : 29,000.0kHz MODE : FM AG output : 1kHz, 20mV STBY : SEND	Linear detector Power meter (50Ω)	Rear panel	ANT (Directional coupler)	FM IF	VR1	5kHz	
	2) AG output : 2mV						Check	3.5kHz or less

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remakrs
		Test equipment	Unit	Terminal	Unit	Part	Method	
13. IC meter	1) FREQ : 14,175.0kHz MODE : CW CAR LEVEL control : current drain 17.5A Connect Ammeter ⊕ : EXT power supply ⊕ terminal ⊖ : Power connector ⊕ terminal STBY : SEND	IC meter (Power meter)		ANT	Filter	VR5	14A	
14. ALC meter	1) MODE : USB MIC LEVEL control : MIN METER SW : ALC STBY : SEND	ALC meter			IF	VR12	Set to ALC meter starting point.	
	2) FREQ : 14,175.0kHz AG output : 1kHz, 5mV MIC LEVEL control : Set to ALC meter starting point.	Power meter (50Ω)		ANT				
	AG output : +6dB				IF	VR11	Adjust for maximum ALC scale reading.	
15. Speech processor	1) MODE : USB MIC LEVEL control : MIN AG output : 1kHz, 10mV PROC SW : ON and OFF STBY : REC	AM V.M	IF	TP2	IF	VR7	Level should be the same between ON and OFF.	140mV (Reference value)
16. CW side tone	1) MODE : CW AF GAIN control : 12 o'clock VOX SW : MAN STBY : REC Connect KEY to KEY jack and close the key contacts.	AF V.M Oscilloscope AF dummy load	Rear panel	EXT. SP	IF	VR10	0.63V/8Ω	

ADJUSTMENT

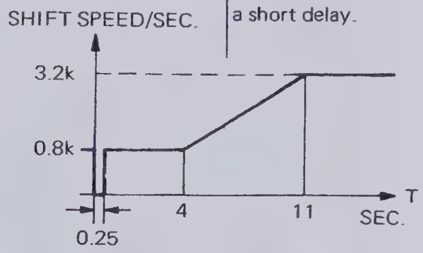
MICROPROCESSOR OPERATION CHECK

Item	Condition	Operation check
1. Reset check	1) FUNCTION SW : A POWER SW : OFF Set the POWER SW ON while depressing the A=B key. Then release the A=B key.	FREQ : 14,000.0kHz MODE : USB VFO A : Lights The "Beeper" sounds simultaneously with POWER ON.
	2) FUNCTION SW : B	FREQ : 14,000.0kHz MODE : USB VFO B : Lights
	3) M.CH SW : ON M.CH SW : change the channels in 1 through 8 order.	The frequency display disappears. M.CH display lights and displays 1–8 in order.
2. Band	1) M.CH SW : OFF 1MHz STEP SW : OFF Depress the "BAND : UP" key once. Press repeatedly.	FREQ : 18,000.0kHz The "Beeper" sounds simultaneously. The MHz display □□,□ counts up. The "Beeper" sounds simultaneously.
	2) Hold the "BAND : UP" on.	FREQ : 14,000.0 → 18,000.0 ↑ ↓ 10,000.0 21,000.0 ↑ ↓ 7,000.0 24,500.0 ↑ ↓ 3,500.0 28,500.0 ↑ ↓ 1,500.0 ← 29,500.0 The "Beeper" sounds at each Key-press.
	3) Depress the "BAND : DOWN" key once.	FREQ : □□,□00.0kHz Displays 1MHz lower frequency from that previously displayed in 2). The "Beeper" sounds.
	Repeat the operation.	The frequency display steps down 1MHz at each key-press. The "Beeper" sounds.
	4) Hold the "BAND : DOWN" key on.	The frequency display in 2) steps down. The "Beeper" sounds at each key-press.
	5) 1MHz STEP SW : ON Hold the "UP" key on.	FREQ : □□,000.0kHz The MHz display □□ advances 1MHz at each key-press.
	Hold the "DOWN" key on.	The display steps down 1MHz at each key-press.

Item	Condition	Operation check
3. Dial	1) FREQ : 0,000.0kHz ① Check to see if the display does not change by turning the VFO control counterclockwise. And adjust the index by turning it in the same way. ② Turn the VFO control slowly clockwise. STEP SW : OFF	One revolution of VFO is 9.5–10kHz.
	2) STEP SW : ON	One revolution of VFO is is 95–100kHz.
4. Memory write	1) FREQ : 14,000.0kHz MODE : USB M.CH SW : 1 M.IN SW : ON	The "Beeper" sounds when "M.IN" key is depressed.
	2) M.CH SW : 6 M.IN SW : ON	
	3) FREQ : 14,010.0kHz M.CH SW : 7 M.IN SW : ON	
	4) M.CH SW : 8 M.IN SW : ON	The "Beeper" sounds continuously when "M.IN" key is depressed.
	5) FREQ : 14,020.0kHz M.CH SW : 8 M.IN SW : ON	The continuous tone stops when the "M.IN" key is depressed.
	6) FREQ : 7,000.0kHz MODE : LSB M.CH SW : 2 M.IN SW : ON	The "Beeper" sounds when the "M.IN" key is depressed.
	7) FREQ : 21,000.0kHz MODE : CW M.CH SW : 3 M.IN SW : ON	
	8) FREQ : 24,500.0kHz MODE : AM M.CH SW : 4 M.IN SW : ON	
	9) FREQ : 29,500.0kHz MODE : FM M.CH SW : 5 M.IN SW : ON	
5. Memory recall (1)	1) M.CH SW : ON STBY SW : REC	"M.CH" display lights. FREQ. MODE
	M.CH SW : 1	14,000.0kHz USB
	2	7,000.0kHz LSB
	3	21,000.0kHz CW
	4	24,500.0kHz AM
	5	29,500.0kHz FM
	6	14,000.0kHz USB
	7	14,010.0kHz USB
	2) M.CH SW : 8 STBY SW : REC	FREQ : 14,010.0kHz USB
	STBY SW : SEND	FREQ . 14,020.0kHz USB

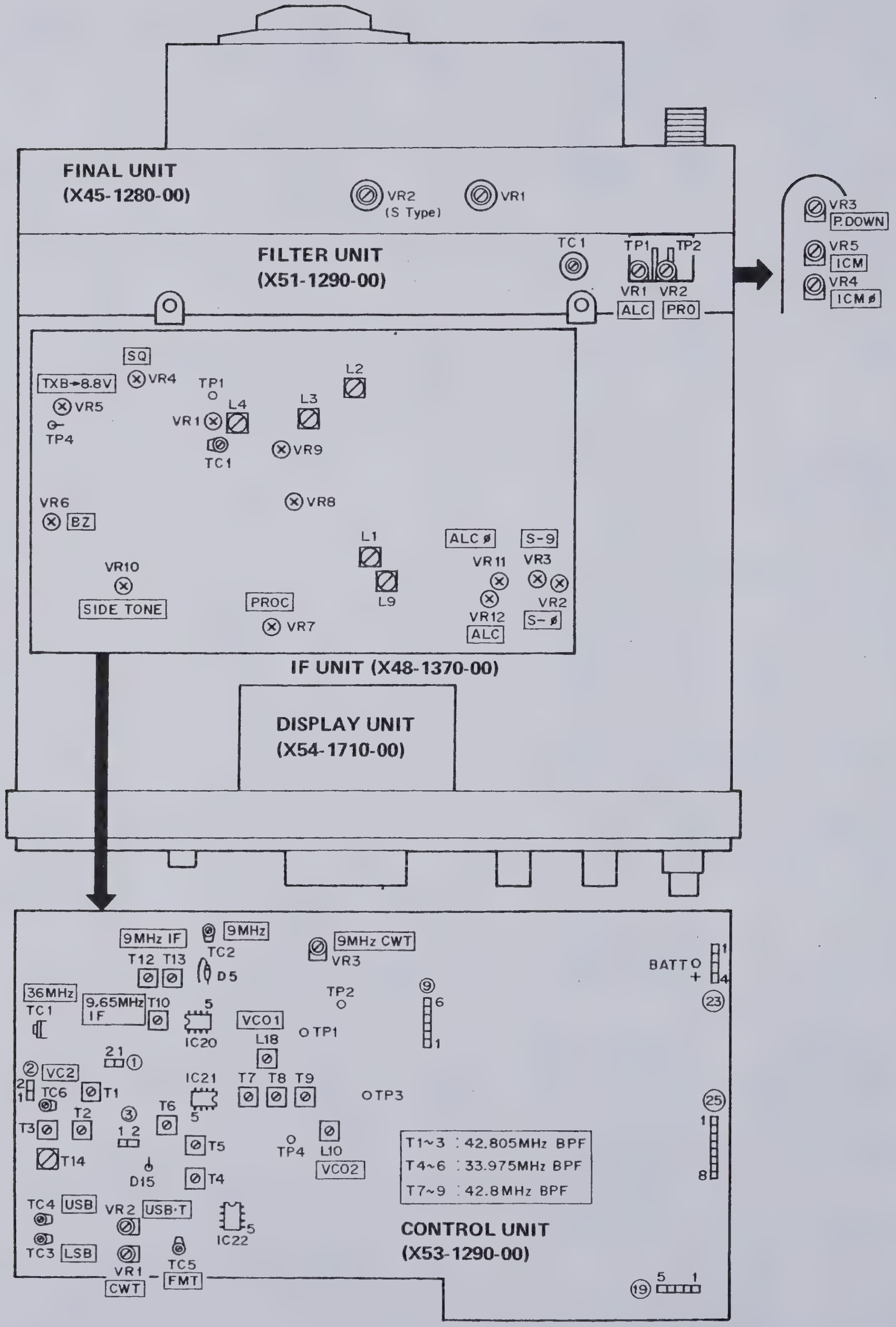
ADJUSTMENT

Item	Condition	Operation check
6. Memory recall (2)	1) M.CH SW : 1 [MR] SW : ON	FREQ : 14,000.0kHz The "Beeper" sounds.
	2) Turn the VFO both clockwise and counterclockwise.	The display shows normal frequency control.
	3) [MR] SW : ON	FREQ : 14,000.0kHz The tone sounds simultaneously.
7. Memory erase	1) M.CH SW : 8 STBY : REC Place the [M.IN] SW : ON While depressing either UP or DOWN BAND SW key.	The frequency display clears after the BAND and [M.IN] SW keys are released. The "Beeper" sounds.
8. Memory scan	1) [MS] SW : ON	M.CH : →1→2→3→4 7←6←5← Displays the frequencies and modes in Item 5. 1).
9. Program scan	1) [MS] SW : OFF [PG.S] SW : ON PG. SCAN SPEED Pot. : MIN.	The scan starts from M.CH : 6 (FREQ : 14,000.0kHz) to M.CH : 7 (FREQ : 14,010.0kHz). When the frequency reaches 14,010.0kHz, the scan returns to 14,000.0 kHz and starts again. The scan speed is approx. 500Hz/sec. The "Beeper" sounds at the start and at return to the starting frequency.
	PG. SCAN SPEED Pot. : MAX	The scan speed is approx. 2.5kHz/sec. (five times faster then MIN).
	2) [HOLD] SW : ON	The scan stops
	Turn the VFO clockwise.	The scan repeats within the preset range from M.CH : 6 → M.CH : 7 The "Beeper" sounds at the start and at return to the starting frequency.
	Turn the VFO counterclockwise	The scan stops at the frequency preset in M.CH : 6.
	3) [HOLD] SW : OFF	The scan resumes from the displayed frequency.

Item	Condition	Operation check
10. A=B (Function)	1) [MS] SW : OFF [PG.S] SW : OFF [M.CH] SW : OFF FUNCTION : B FREQ : 7,000.0kHz MODE : LSB	"VFO B" display lights.
	FUNCTION : A FREQ : 14,000.0kHz MODE : USB	"VFO A" display lights.
	2) FUNCTION : A [A=B] SW : ON FUNCTION : B	FREQ : 14,000.0kHz MODE : USB FREQ : 14,000.0kHz MODE : USB
11. UP/DOWN (Microphone)	1) Connect a microphone (MC-60A or MC-42S). Momentarily depress the "UP" key several times.	When the 100Hz digit changes, the 100Hz upper frequency is displayed after ten key-presses.
	2) Hold the "UP" key on. 	The frequency continuously advances forward after a short delay.
	3) Momentarily depress the "DOWN" key.	When the display of 100Hz range changes, the 100Hz lower frequency is displayed after ten key-pressed.
	4) Hold the "DOWN" key on.	The frequency continuously advences backward after a short delay.
12. Lock	1) [LOCK] SW : ON Turn the VFO both clockwise and counter-clockwise.	The frequency displayed at lock does not change.
	2) Depress both BAND UP and DOWN keys.	
	3) Hold the microphone (MC-60A or MC-42S) "UP" and "DOWN" key on.	

ADJUSTMENT

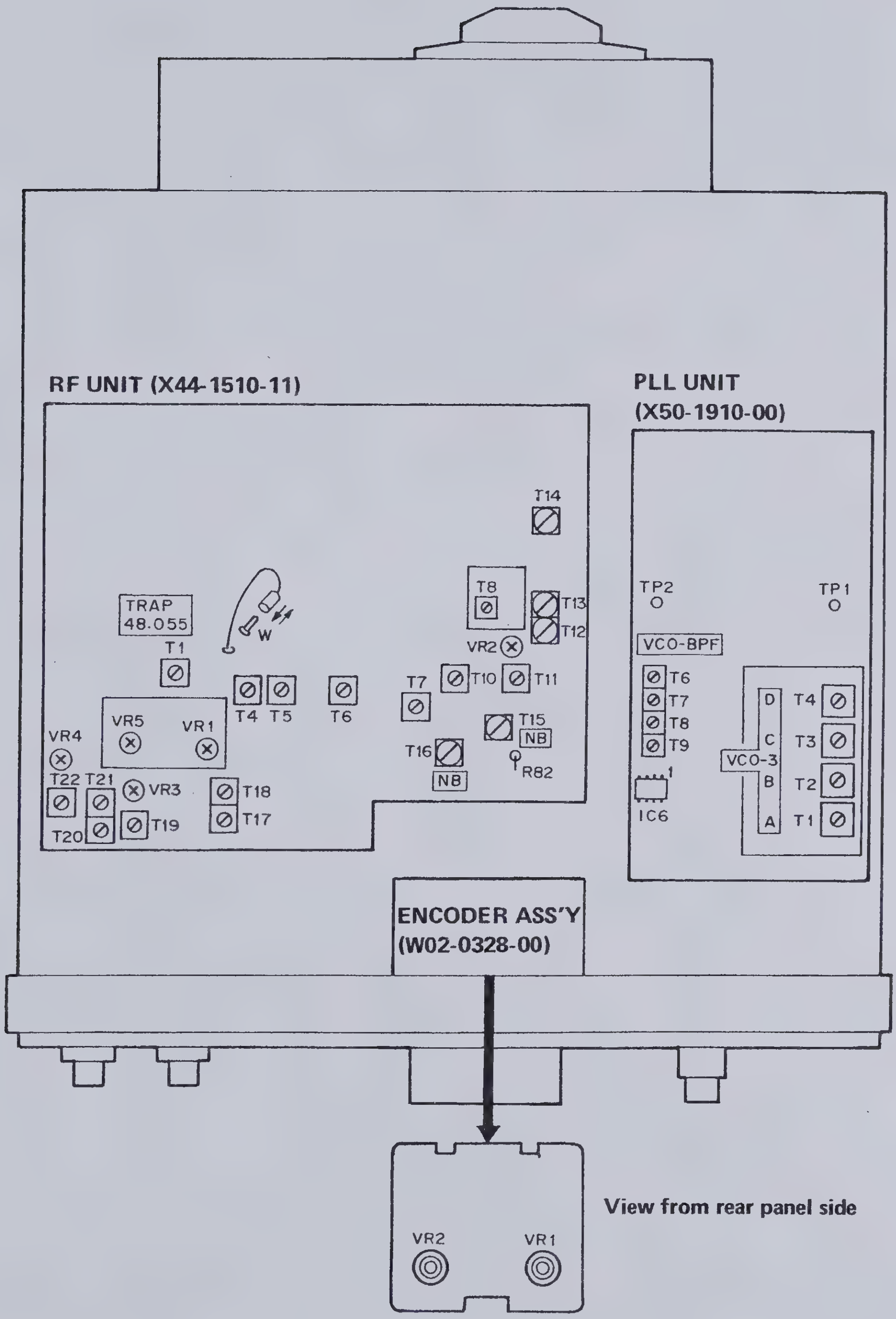
TOP VIEW



T1~3 : 42.805MHz BPF
T4~6 : 33.975MHz BPF
T7~9 : 42.8MHz BPF

ADJUSTMENT

BOTTOM VIEW



LEVEL DIAGRAM

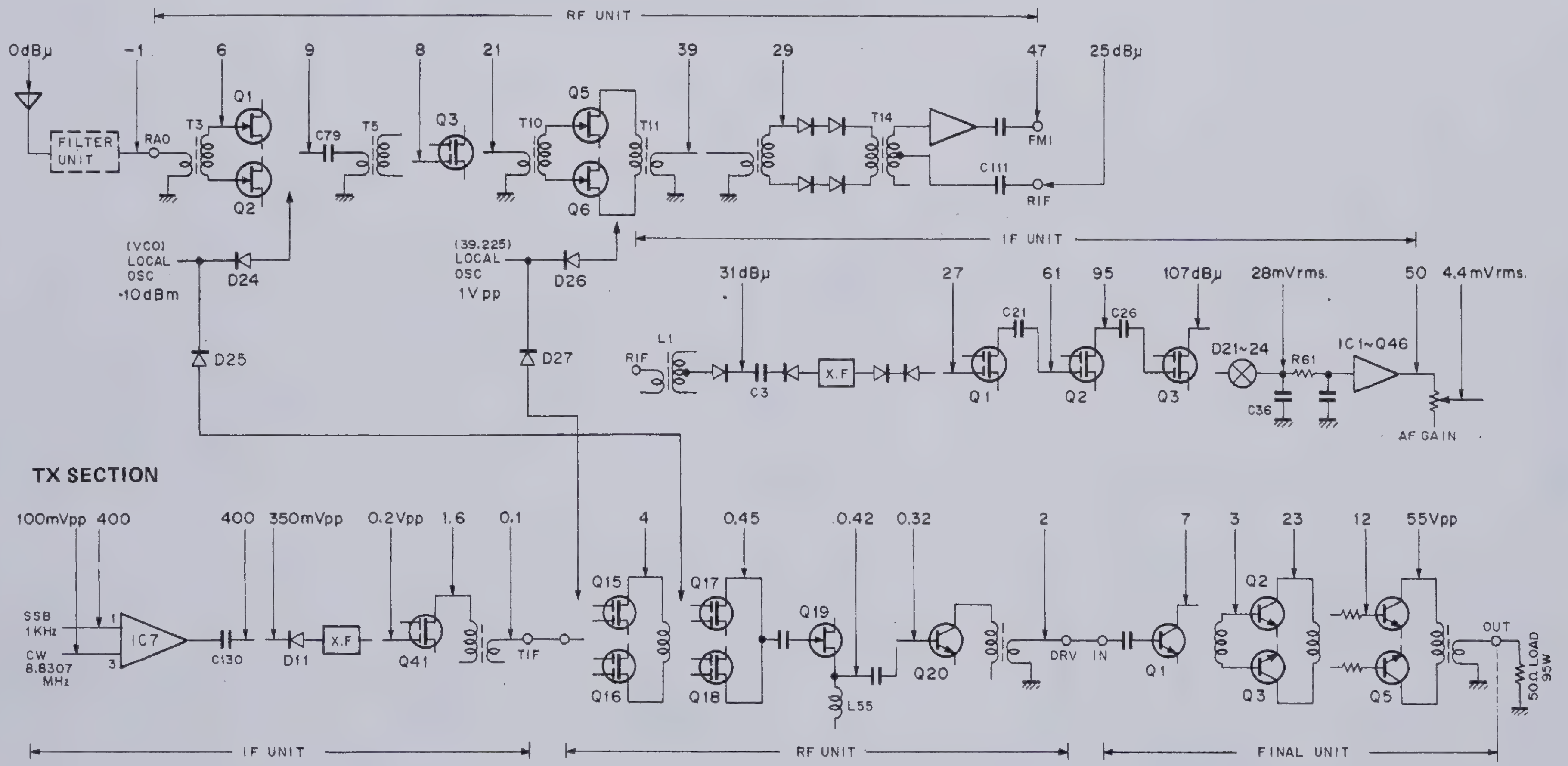
RX SECTION

FREQUENCY : 14.200MHz
INPUT : 0dBμ
AF OUTPUT : 0.63V at 8Ω

NOTES

1) The figures shown are signal generator output required for a constant audio output with a constant AF gain control setting. Set the AF gain control for 0.63V/8Ω (50mW) audio output at 0dB signal generator input at 14.200MHz.

2) To measure signal generator output connect a 0.01μF 500WV capacitor between the signal generator and the check point.



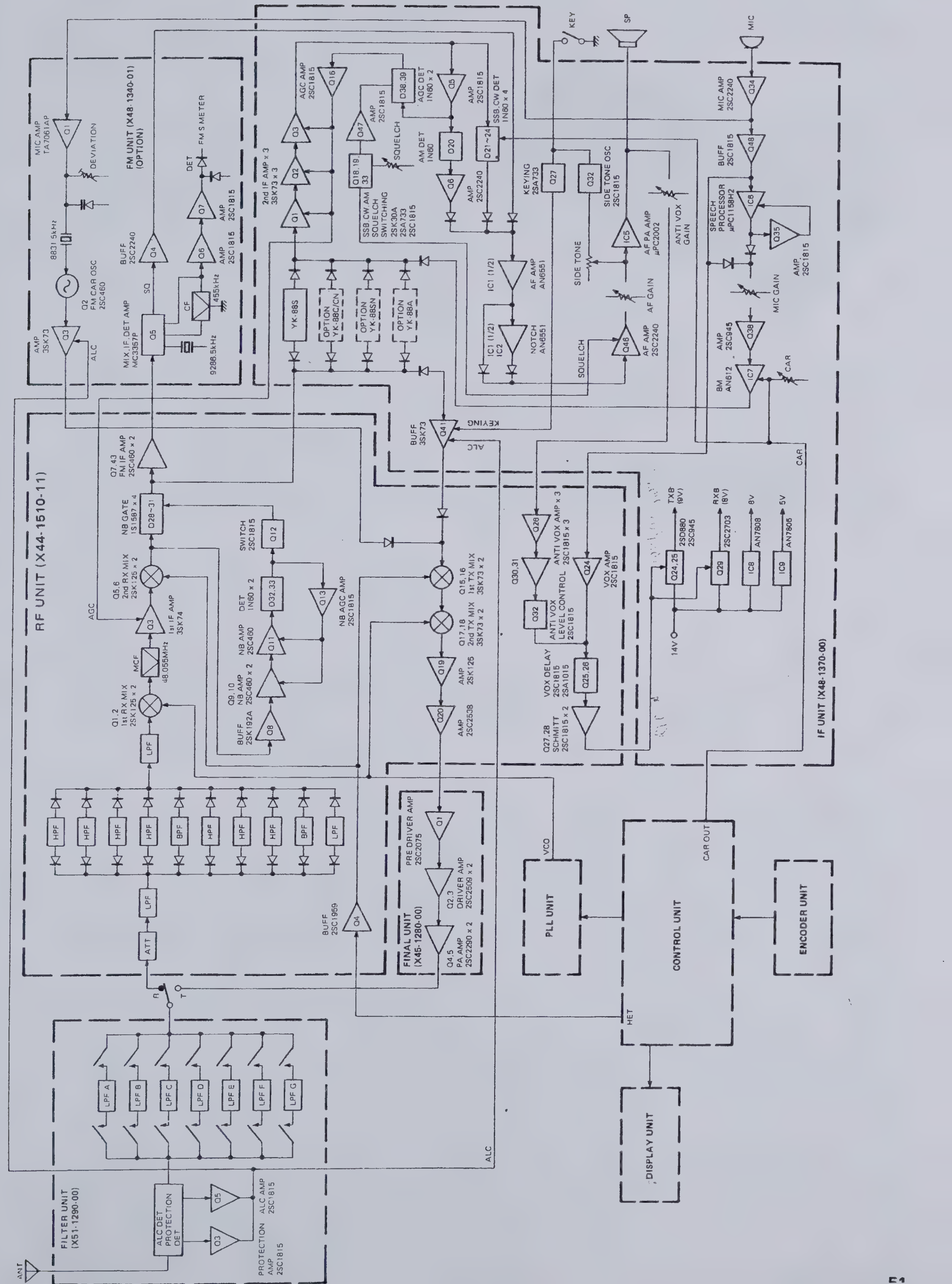
TX SECTION

FREQUENCY : 14.200MHz
AF INPUT
SSB : 1kHz,400mVpp to IC7 1pin.
CW : 8.8307MHz, 100mVpp to IC7 3pin.

NOTES

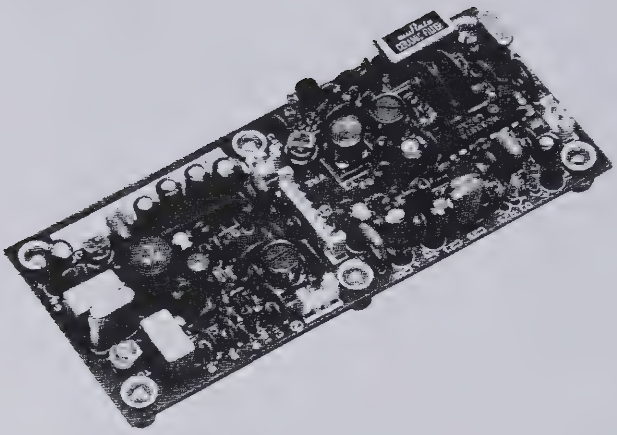
1) Adjust ALC level control for full scale reading.

BLOCK DIAGRAM TS-430S



FM-430

OUTSIDE VIEW



PARTS LIST

SEMICONDUCTOR

N : New parts

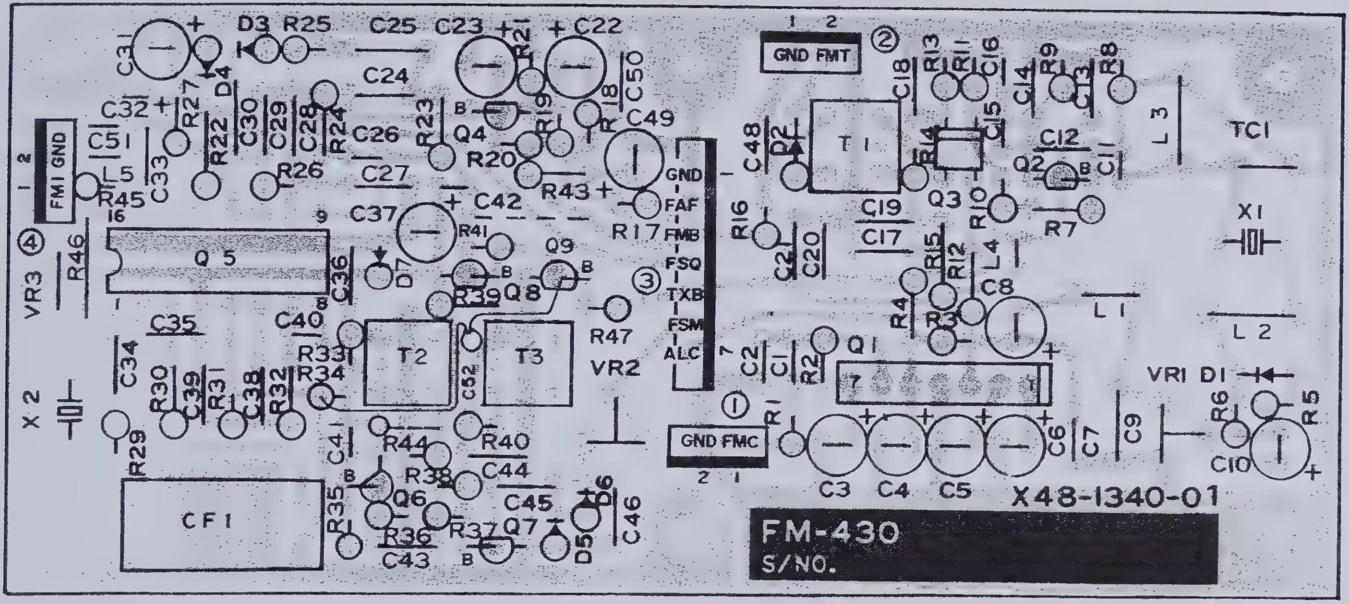
Item	Re-marks	Name	Item	Re-marks	Name
Diode		1N60	**FET**		3SK73(GR)
		1S1555			
		1S2208	**IC**		MC3357P
Zener diode		WZ-071			TA7061AP
TR		2SA1015(Y)			
		2SC460(B)			
		2SC1815(Y)			
		2SC2240(GR)			

Part No.	Re-marks	Description	Ref. No.
FM-430 GENERAL			
B50-4029-00	N	Instruction manual	
H01-4471-13	N	Packing carton (inside)	
H12-0483-04		Cushion	
H25-0029-04		Protective bag, Screw	
H25-0120-04		Protective bag, Unit	
J61-0401-05		Nylon band x 4	
N87-3012-46		Self tapping screw x 6	
X48-1340-01	N	FM unit	

Part No.	Re-marks	Description	Ref. No.	Q'ty
FM UNIT (X48-1340-01)				
C05-0031-15		Ceramic trimmer 10P	TC1	1
CC45SL1H050C		C 5P	C15	1
CC45SL1H101J		C 100P	C29	1
CC45SL1H120J		C 12P	C40	1
CC45SL1H121J		C 120P	C34	1
CC45SL1H150J		C 15P	C51	1
CC45SL1H220J		C 22P	C16,41	2
CC45SL1H221J		C 220P	C12,14	2
CC45SL1H560J		C 56P	C35	1
CC45SL1H680J		C 68P	C27,28	2
CC45UJ1H070D		C 7P	C11	1
CE04W1A101M		E 100 10V	C37	1
CE04W1A220M		E 22 10V	C4,23	2
CE04W1A470M		E 47 10V	C3,6	2
CE04W1E4R7M		E 4.7 25V	C49	1
CE04W1H010M		E 1 50V	C5,8,10,22,31	5
CK45B1H102K		C 0.001	C26,45	2
CK45B1H152K		C 0.0015	C42	1
CK45F1H103Z		C 0.01	C13,17,20,21,33, 36,43,46	8
CK45F1H223Z		C 0.022	C18,19,44,48	4
CK45F1H473Z		C 0.047	C38,39	2
CQ92M1H103K		ML 0.01	C2,7,24	3
CQ92M1H333K		ML 0.033	C50	1
CQ92M1H393K		ML 0.039	C9	1
CQ92M1H472K		ML 0.0047	C1	1
CQ92M1H473K		ML 0.047	C25,30	2
CS15E1C2R2M		T 2.2 16V	C32	1
E40-0273-05		Mini connector 2P		3
E40-0773-05		Mini connector 7P		1
J31-0502-04		PC board collar		6
J42-0428-05		PC board bushing		6
L30-0199-06		Tuning coil	T3	1
L30-0503-05		Tuning coil	T2	1
L34-0535-05		Tuning coil	T1	1
L33-0639-05		Choke coil 10μH	L3	1
L33-0640-05		Choke coil 12μH	L2	1
L40-1511-03		Ferri-inductor 150μH	L4	1
L40-1541-27		Ferri-inductor 150mH	L1	1
L40-6891-01		Ferri-inductor 6.8μH	L5	1
C72-0309-06		Ceramic filter CFT455F2	CF1	1
C77-0939-05		Crystal 9.2865MHz	X2	1
C77-0940-05		Crystal 8.8315MHz	X1	1
R12-3430-05		Trim. pot. 10kΩ(B)	VR1	1
R12-4408-05		Trim. pot. 50kΩ(B)	VR2	1
R12-4410-05		Trim. pot. 50kΩ	VR3	1
R92-0150-05		Short jumper		2

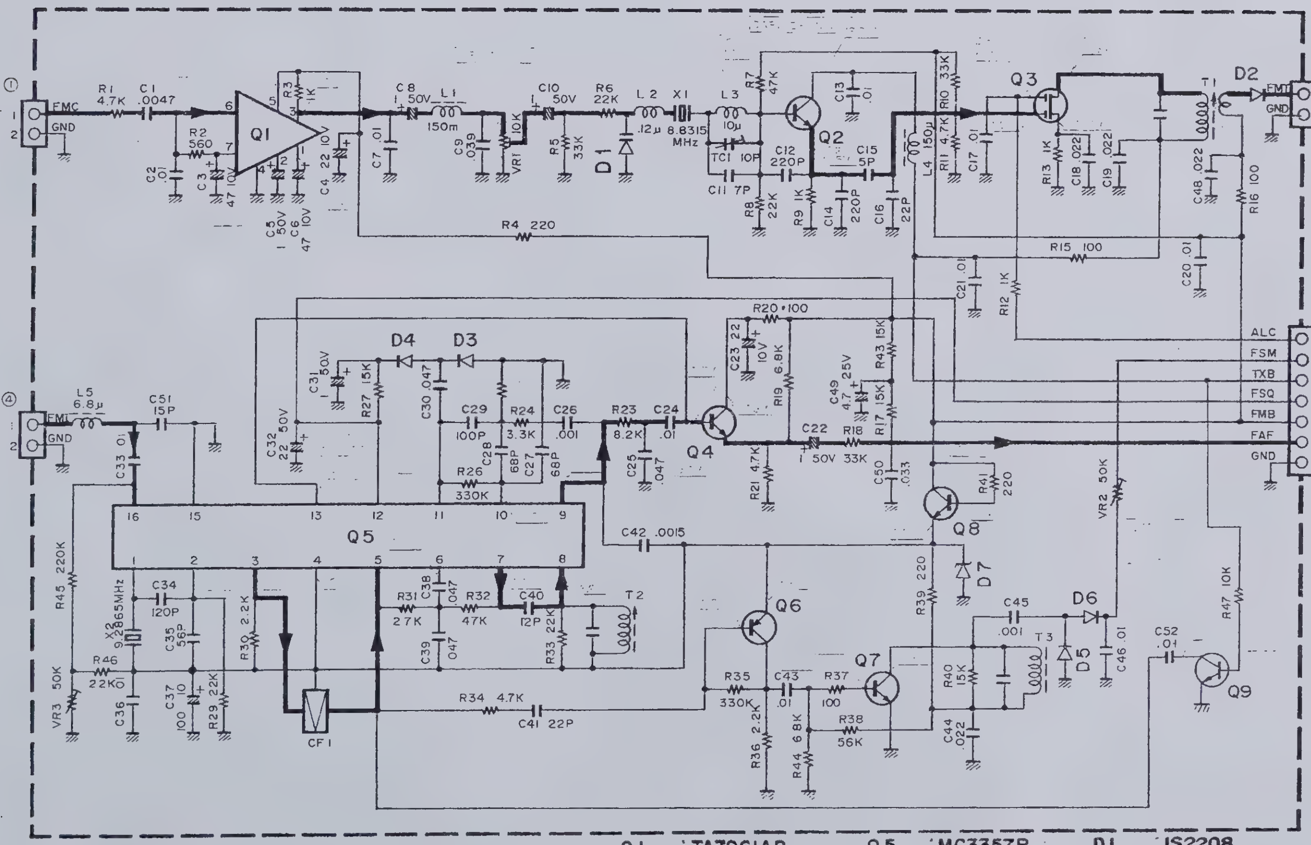
FM-430

PC BOARD VIEW



SCHEMATIC DIAGRAM

FM UNIT(X48-1340-01)

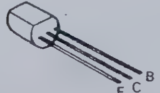


Q1 : TA7061AP
Q2 : 2SC460(B)
Q3 : 3SK73(GR)
Q4 : 2SC2240(GR)

Q5 : MC3357P
Q6 : 2SA1015(Y)
Q7～9 : 2SC1815(Y)

D1 : IS2208
D2 : IS1555
D3～6 : IN60
D7 : WZ071

2SA1015 2SC1815
2SC2240



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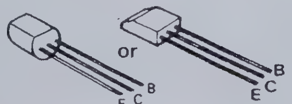
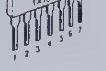


TC7061AP



SPECIFICATIONS

Input voltage:	120/220/240V AC±10%, 50/60Hz
Output voltage:	13.8V DC (standard voltage)
Output current:	20 A (25% duty cycle) 15A (50% duty cycle)
Continuous load current:	10 A max. (including external output terminal)
Output voltage fluctuation:	Within ±0.7 V at AC 120V, 220V, 240V±10% (Load current: 15A) Within 0.7 V between 2–15 A load. (No-load output voltage: Less than 16V at 120V/220/240V. AC)
Ripple voltage.	Less than 20 mV (rms) at 13.8V, output current 15A.
Power consumption:	Approx. 480 W (at 120/220/240V AC. 13.8V DC, 20A)
Dimensions:	173 (6-13/16) W x 95 (3-3/4)H x 245 (9-5/8) D mm (inch)
Weight:	Approx. 7 kg (15.4 lbs.)

PARTS LIST

SEMICONDUCTOR

N : New parts

Item	Re-marks	Name	Item	Re-marks	Name
Diode		1S1555	**Thermistor**		32D27
		S25VB10			SDT1000(F)
		U05B	**TR**		2N5885
					2SA562(Y)
Zener diode		RD9.1EB2			2SB512(P)
LED		SLP144B			2SC1815(Y)

PS-430 GENERAL

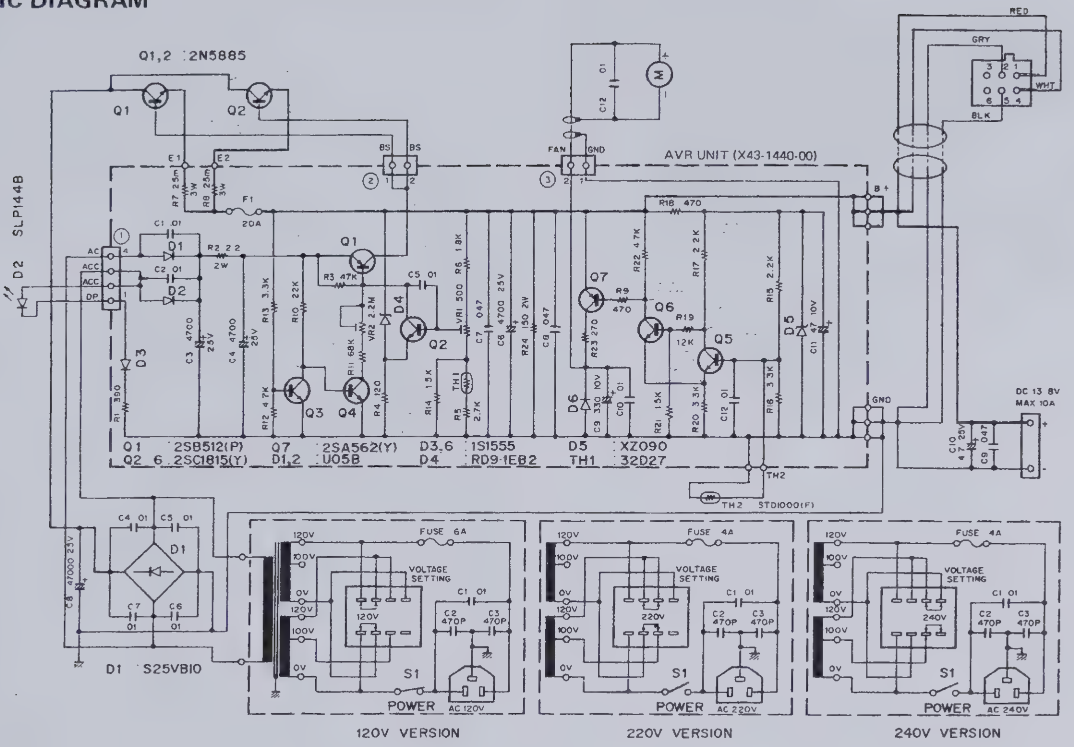
Part No.	Re-marks	Description	Ref. No.
A01-0937-02	N	Case (upper)	
A01-0938-12	N	Case (lower)	
A20-2461-13	N	Panel **K,M,W,X**	
A20-2462-03	N	Panel **T**	
B39-0407-04		Spacer x 2	
B40-2634-04	N	Name plate	
B41-0626-14	N	Voltage sheet 120V **K**	
B41-0627-14	N	Voltage sheet 220V **M,W**	
B41-0630-04	N	Voltage sheet 240V **T,X**	
B42-1733-14		Voltage sheet	
B42-1770-04	N	Current indication sheet **M,T,W,X**	
B46-0404-00		Warranty card **K**	
B50-4014-10	N	Instruction manual **K,M,W,X**	
B50-4015-00	N	Instruction manual **T**	
CE04W1E4R7M		E 4.7 25V	C10
CK45E2H103P		C 0.01 500V x 4	C4–7
CK45F1H473Z		C 0.047 x 2	C9,11
C90-0865-05	N	E 47000 25V	C8
C91-0079-05		C 0.01	C1
C91-0496-05		C 470P x 2	C2,3
E18-0351-05		3P Inlet	
E20-0282-05		2P terminal plate	
E22-0472-05		Lug plate	
E23-0015-04		GND lug	
E23-0425-05		Lug terminal	
E30-1643-15		AC cord **K,M**	
E30-1644-15		AC cord **T**	
E30-1645-05		AC cord **W**	
E30-1647-05		AC cord **X**	
E31-0500-05		Cable with plug	
F01-0786-03	N	Heat sink plate	
F01-0787-13	N	Heat sink	
F05-4022-05		Fuse 4A **K**	
F05-4022-05		Fuse 4A x 2 **M,T,W,X**	
F05-6021-05		Fuse 6A x 2 **K**	
F05-6021-05		Fuse 6A **M,T,W,X**	
F07-0847-04	N	Fan cover	
F09-0405-24		Fan	
H01-4451-14	N	Packing carton (inside) **K,M,W,X**	
H01-4452-04	N	Packing carton (inside) **T**	
H10-2567-02	N	Packing fixture (F)	
H10-2568-02	N	Packing fixture (R)	
H12-1319-04	N	Cushion	
H20-1420-03		Protective cover	
H25-0105-04		Protective bag	
J02-0323-05		Foot x 2	
J02-0427-04	N	Assistant foot	
J13-0033-15		Fuse holder	
J42-0403-05		Cord bushing	
J42-0095-05	N	Rubber bushing x 3	
K29-0758-04		Push knob	
L01-8166-25	N	Power transf.	
S29-2406-05		Voltage selector switch	S2
S40-1405-05	N	Power switch	S1
T42-0301-05		Fan motor	
X43-1440-00	N	AVR unit	

AVR UNIT (X43-1440-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1A331M		E 330 10V	C9	1
CE04W1A470M		E 47 10V	C11	1
CK45F1H103Z		C 0.01	C1,2,5	3
CK45F1H473Z		C 0.047	C7,8	2
C90-0814-05		E 4700 25V	C3,4,6	3
E23-0022-04		Terminal		8
E23-0046-04		Square terminal		2
E40-0273-05		Mini connector 2P		2
E40-0473-05		Mini connector 4P		1
F05-2035-15		Fuse 20A		1
J31-0502-04		PC board collar		4
J42-0428-05		PC board bushing		4
R12-0427-05		Trim. pot. 500Ω (B)	VR1	1
R12-8404-05		Trim. pot. 2.2MΩ (B)	VR2	1
RS14GB3D2R2J		MF 2.2Ω 2W	R2	1
R92-0663-05	N	Cement 0.025Ω 3W	R7,8	2

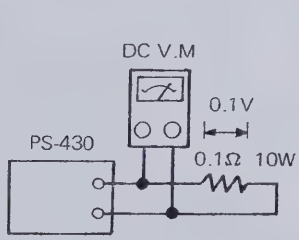
PS-430

SCHEMATIC DIAGRAM



ADJUSTMENT

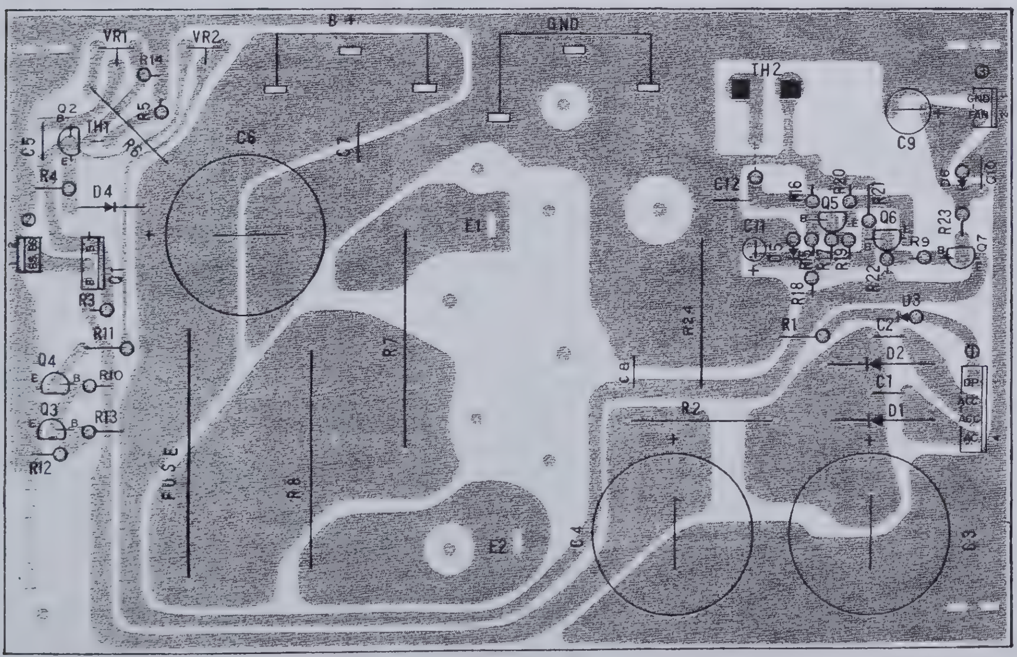
1. Connect the load and set the current to 15A.
2. Adjust output voltage to 13.8V ± 0.4V with VR1.
3. Protection circuit



Connect a 0.1Ω 10W resistor and adjust VR2 so that 0.1V DC is obtained.

PC BOARD VIEW

AVR UNIT (X43-1440-00) Component side view



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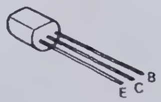

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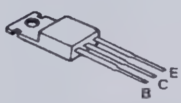
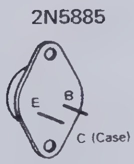
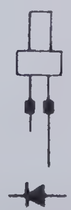


2N5885

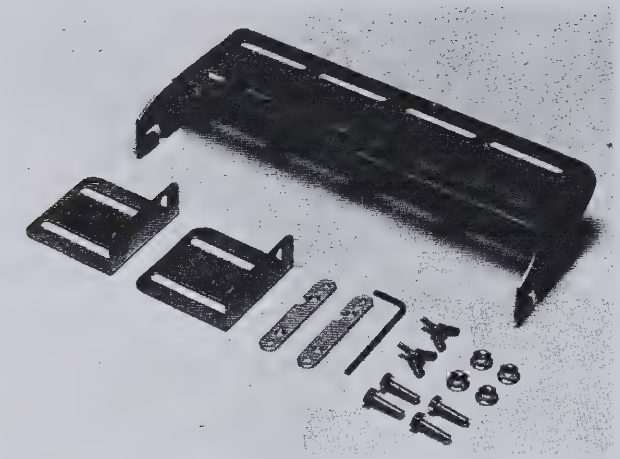


SLP-144B



MB-430/SP-430

MB-430 OUTSIDE VIEW



SP-430 SPECIFICATIONS

SPEAKER SIZE	3"
RATED INPUT	1.0 watts
IMPEDANCE	8 ohms
FREQUENCY RESPONSE	300 Hz to 5 kHz
DIMENSIONS	4-7/8" wide x 3-3/4" high x 9-1/3" deep (excluding feet)
WEIGHT	3.1 lbs.

SP-430 PARTS LIST

N : New parts

Part No.	Re-marks	Description	Ref. No.
A01-0942-03	N	Case (B)	
A01-0944-13	N	Case (A)	
A20-2468-03	N	Panel **K,M**	
A20-2469-03	N	Panel **T**	
A23-1431-04		Rear panel	
B04-0406-04	N	SP grill	
B07-0613-14		SP ring	
B39-0407-04		Spacer x 2	
B46-0404-00		Warranty card **K**	
350-4026-10	N	Instruction manual **K,M**	
B50-4027-00	N	Instruction manual **T**	

Part No.	Re-marks	Description	Ref. No.
E20-0208-04		Terminal plate	
E30-1629-15		SP cord	
G53-0507-04		Packing x 4	
H01-4468-14	N	Packing carton **K,M**	
H01-4469-04	N	Packing carton **T**	
H10-2513-02		Packing fixture (F)	
H10-2514-12		Packing fixture (R)	
H12-0445-04		Cushion	
H20-1407-03		Protective cover	
H25-0077-03		Protective bag Accessory	
J02-0323-05		Foot x 4	
J02-0409-04		Assistant foot	
J21-1144-14		SP mounting hardware x 2	
J21-2573-04		Foot mounting hardware x 2	
J61-0019-05		Vinyle tie	
N15-1030-46		Washer x 8	
N30-3008-46		Round screw x 4	
N35-3006-41		Bind screw x 12 Case	
N87-3006-46		Self tapping screw x 6	
N87-3008-46		Self tapping screw x 4	
T07-0224-05	N	Speaker	

MB-430 PARTS LIST

N : New parts

Part No.	Re-marks	Description	Ref. No.
A13-0635-03	N	Angle	
B50-4016-00	N	Instruction manual	
H01-4453-13	N	Packing control (inside) **M**	
H01-4454-13	N	Packing control (inside) **T**	
H25-0077-04		Protective bag	
H25-0098-04		Protective bag 150 x 480	
J30-0521-04	N	Spacer x 2	
N09-0007-05		Wing bolt x 5	
N09-0008-04		Hex. screw x 6	
N14-0009-04		Nut x 6	
N15-1060-46		Flat washer x 6	
N16-0060-46		Spring washer x 6	
N32-3006-46		Flat screw x 4	
N99-0309-04	N	Hex. head screw x 6	
W01-0401-04		Hex. wrench	

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TRIO-KENWOOD ELECTRONICS, N.V.
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4E. Woodcock Place, Lane Cove, N.S.W. 2066, Australia

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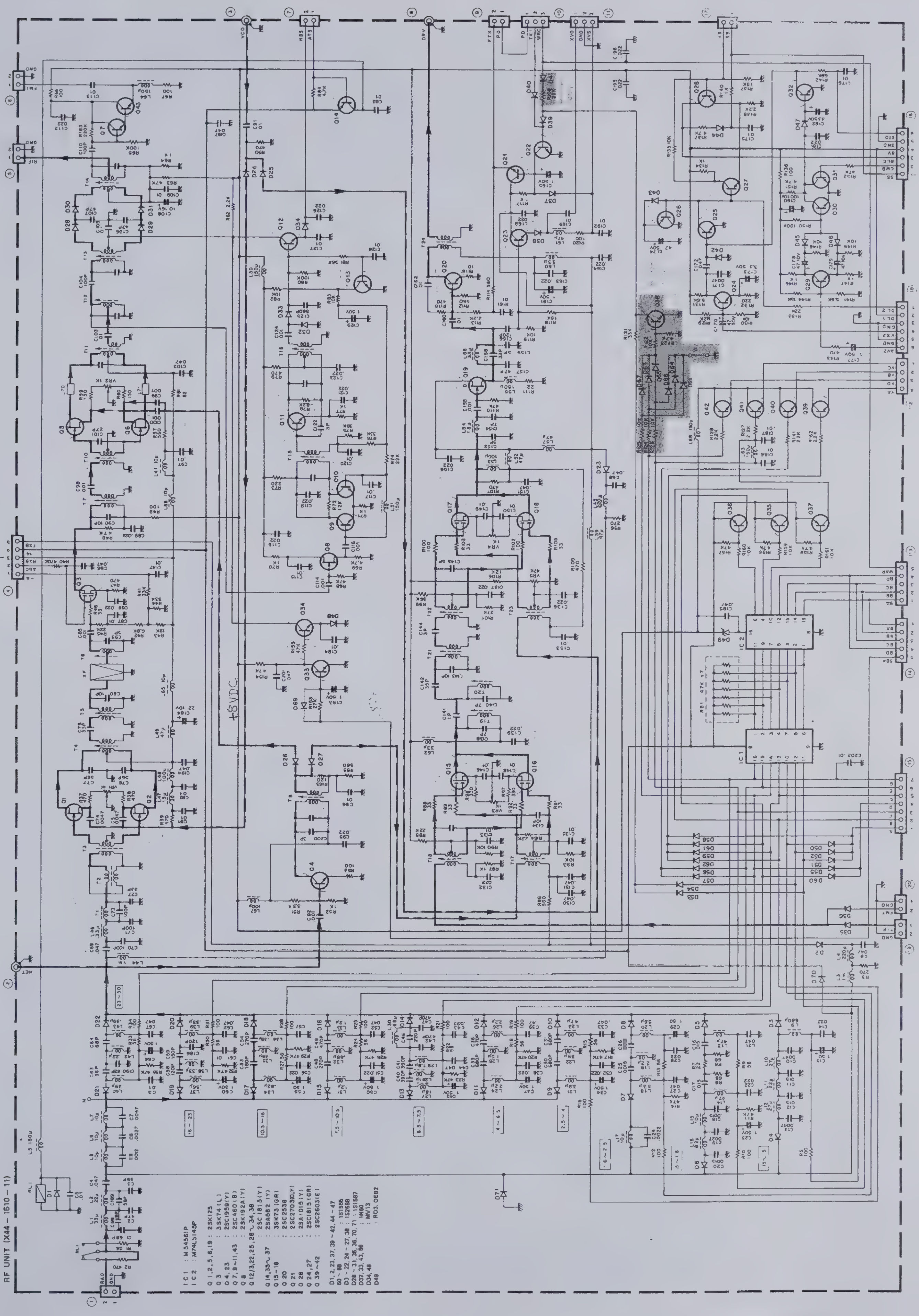
CIRCUIT DIAGRAM TS-430S

RF UNIT (X44-1510-11)



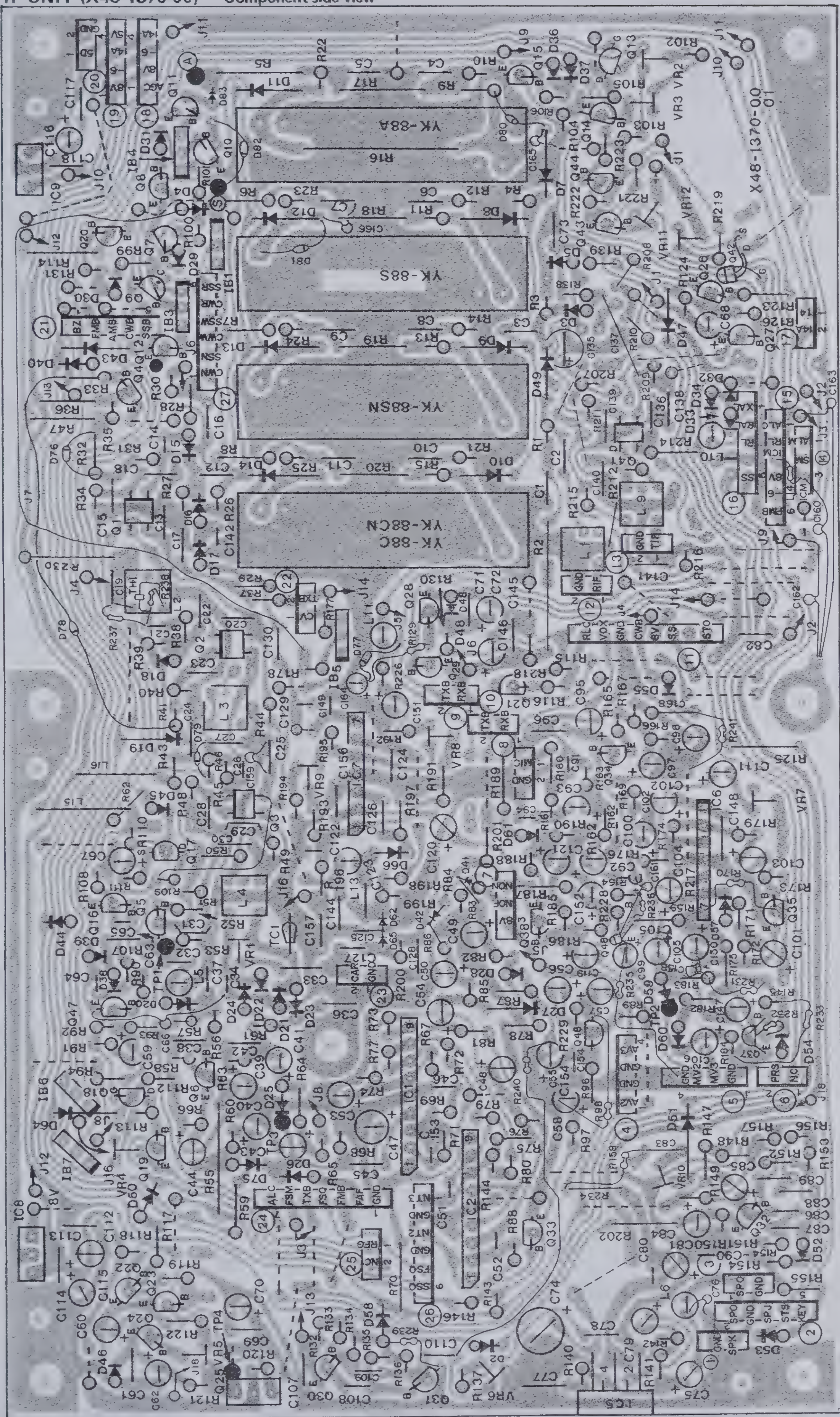
IC1 : M54561P
IC2 : M74LS145P

Q1,2,5,6,19 : 2SK125
Q3 : 3SK74(L)
Q4,23 : 2SC1959(Y)
Q7,9~11,43 : 2SC460(B)
Q8 : 2SK192A(Y)
Q12,13,22,25,28~34,38 : 2SC1815(Y)
Q14,35~37 : 2SA562(Y)
Q15~18 : 3SK73(GR)
Q20 : 2SC2538
Q21 : 2SC2703(O,Y)
Q26 : 2SA1015(Y)
Q24,27 : 2SC1815(GR)
Q39~42 : 2SC2603(E)

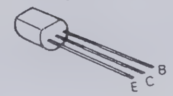
D1,2,23,37,39~42,44~47, 50~68 : 1S1555
D3~22,24~27,38 : 1S2688
D28~31,35,36,70,71 : 1S1587
D32,33,43,69 : 1N60
D34,48 : MV13
D49 : RD3.0EB2

TS-430S PC BOARD VIEW

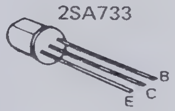
IF UNIT (X48-1370-00) Component side view



2SA1015
2SC945
2SC1815
2SC2240
2SC2703



2SA562
2SA733



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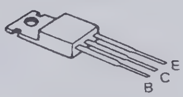

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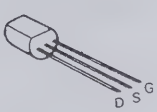
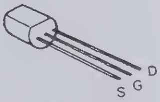
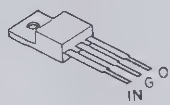


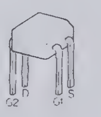
2SK30A



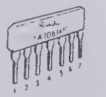
AN7805
AN7808



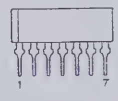
3SK73



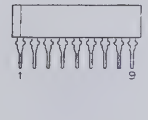
μPC1158H2



AN612



AN6551



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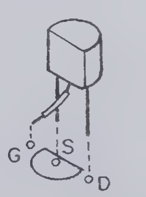

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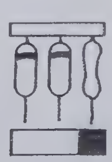
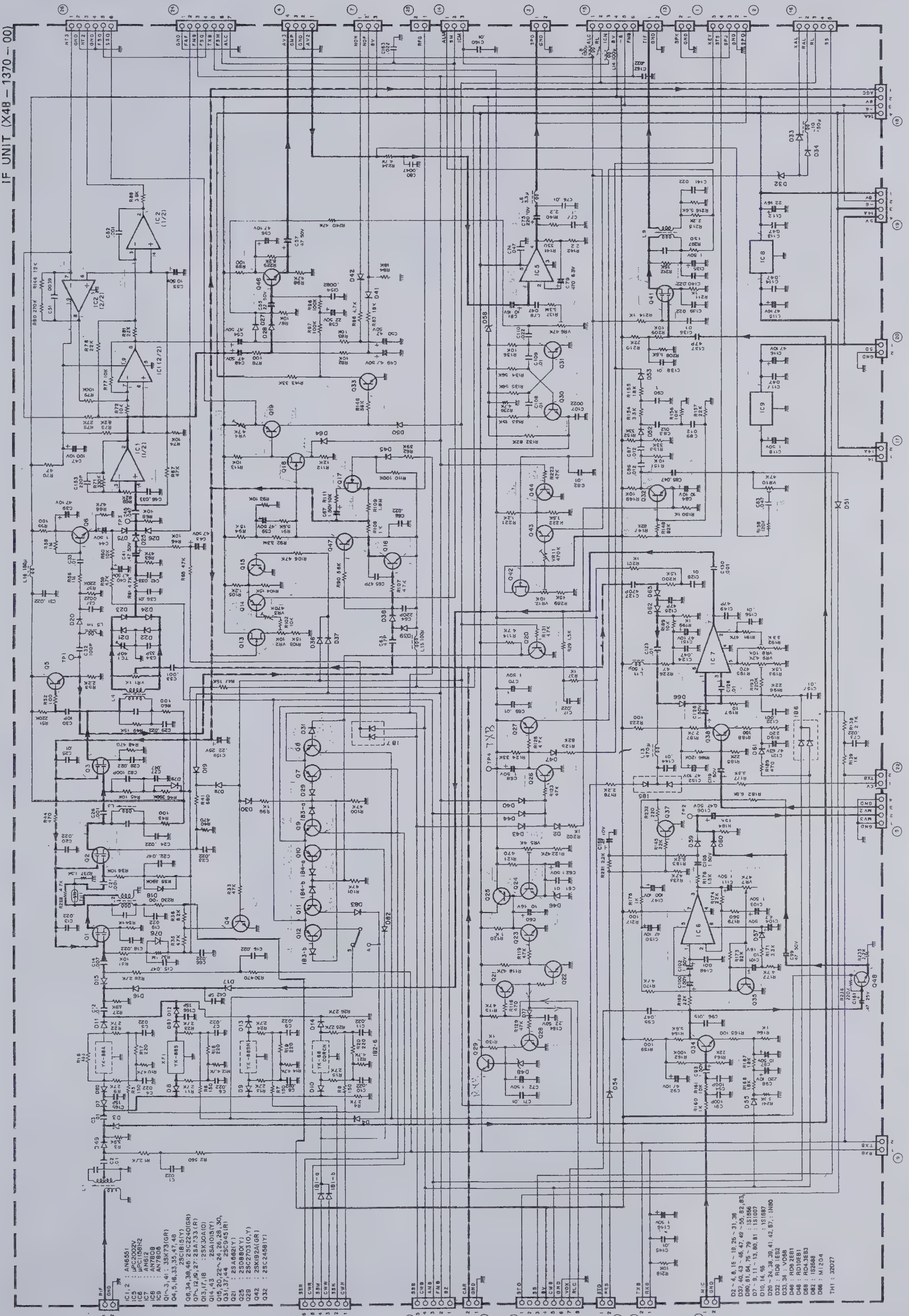
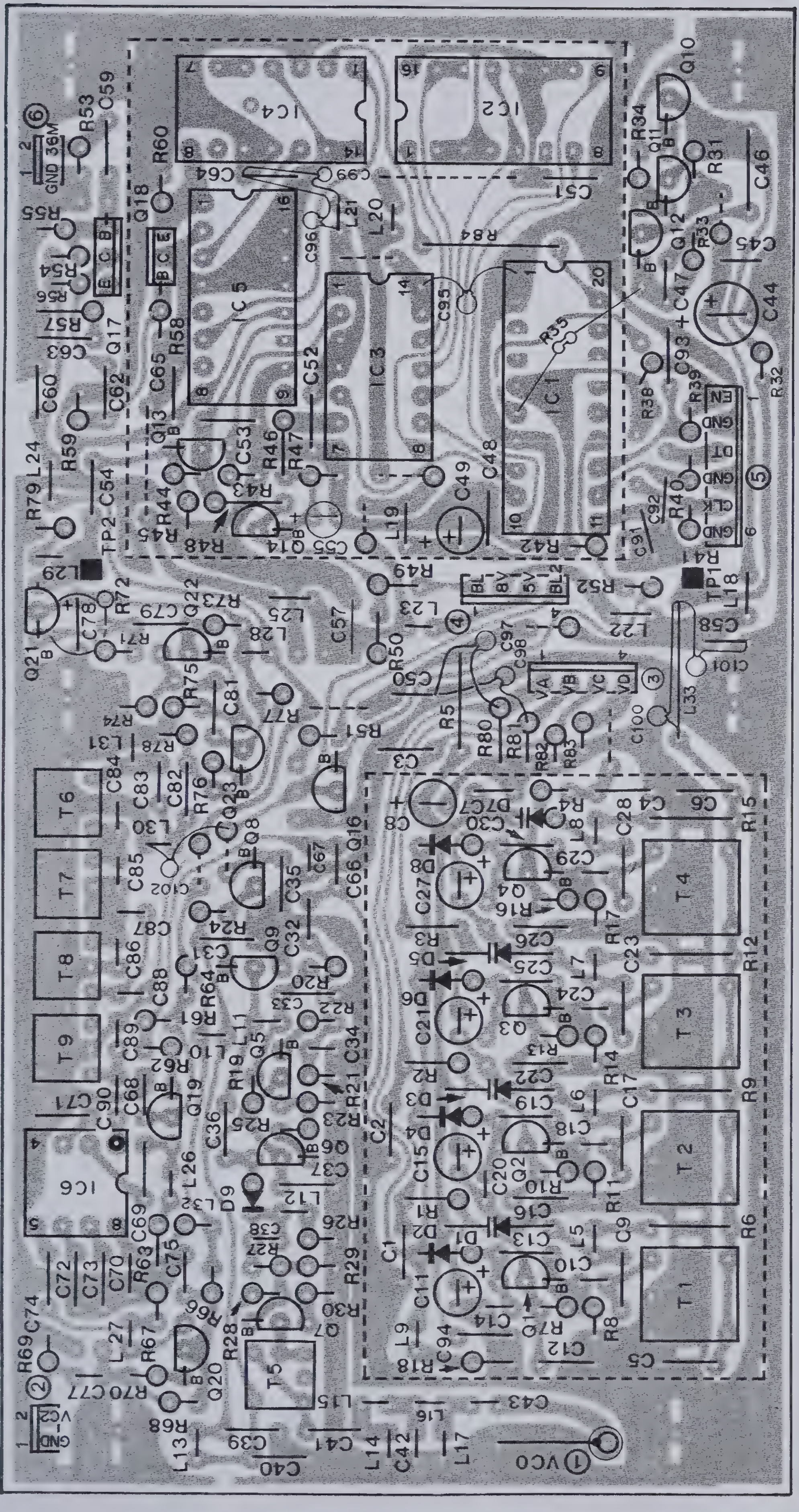


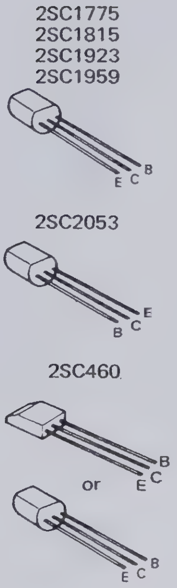
IF UNIT (X48-1370-00)



TS-430S PC BOARD VIEW

PLL UNIT (X50-1910-00) Component side view

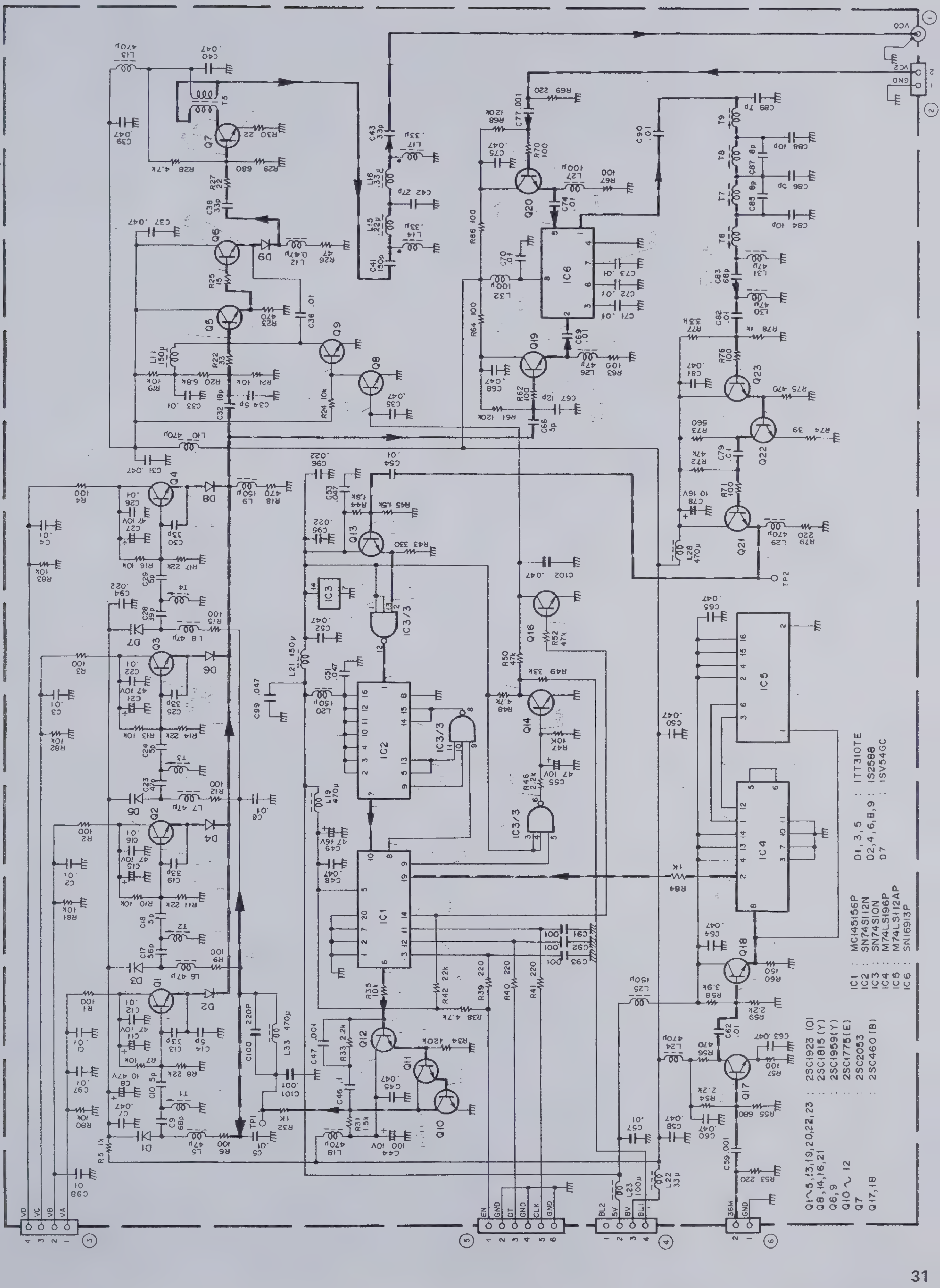




2
4
6

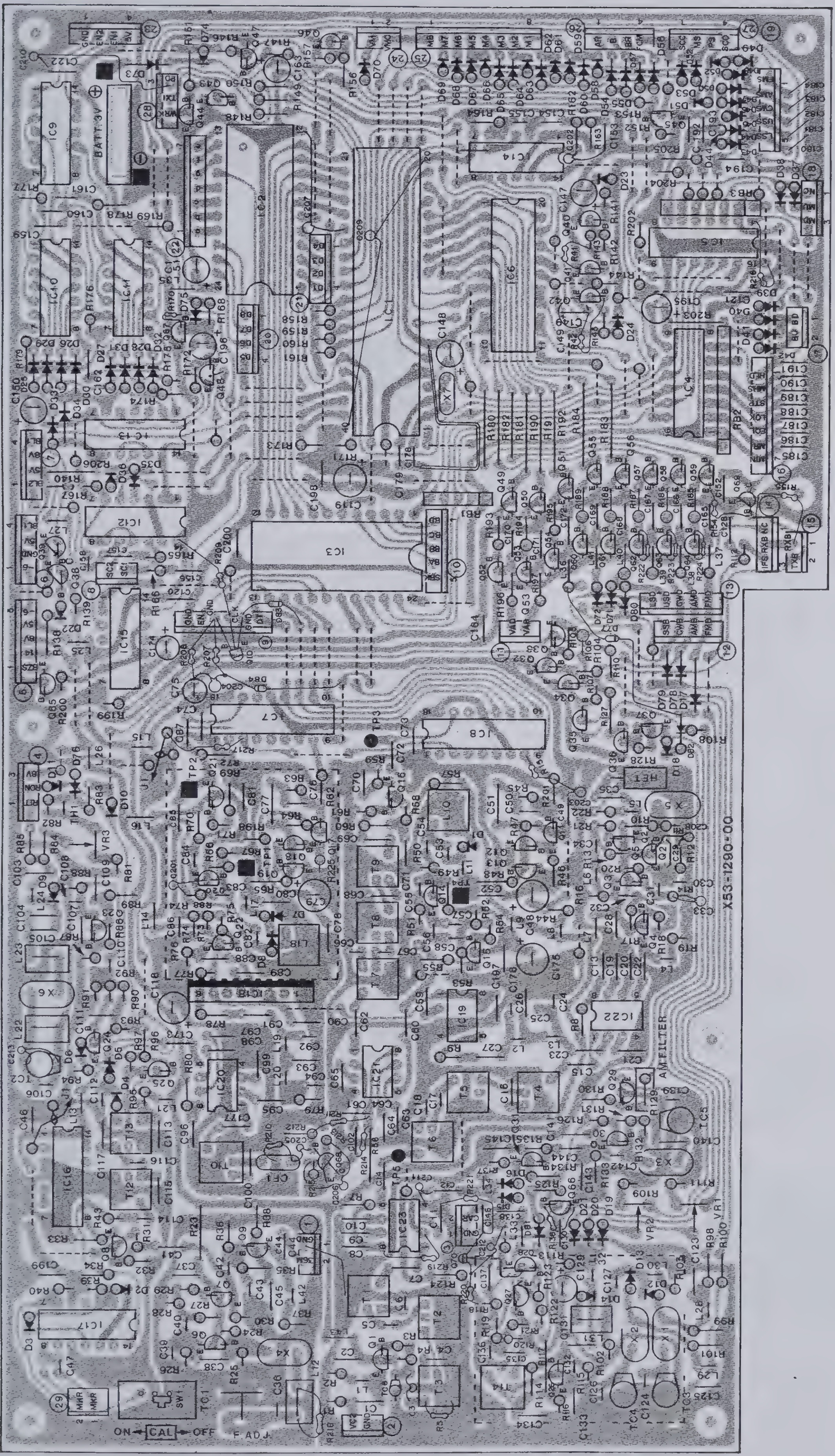
A B C D E F

PLL UNIT (X50-1910-00)

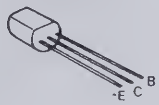


TS-430S PC BOARD VIEW

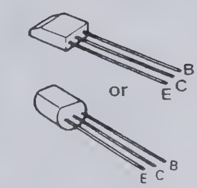
CONTROL UNIT (X53-1290-00) **Component side view**



2SA1015
2SC945
2SC1775
2SC1815
2SC1923
2SC1959



2SC460



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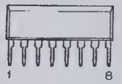
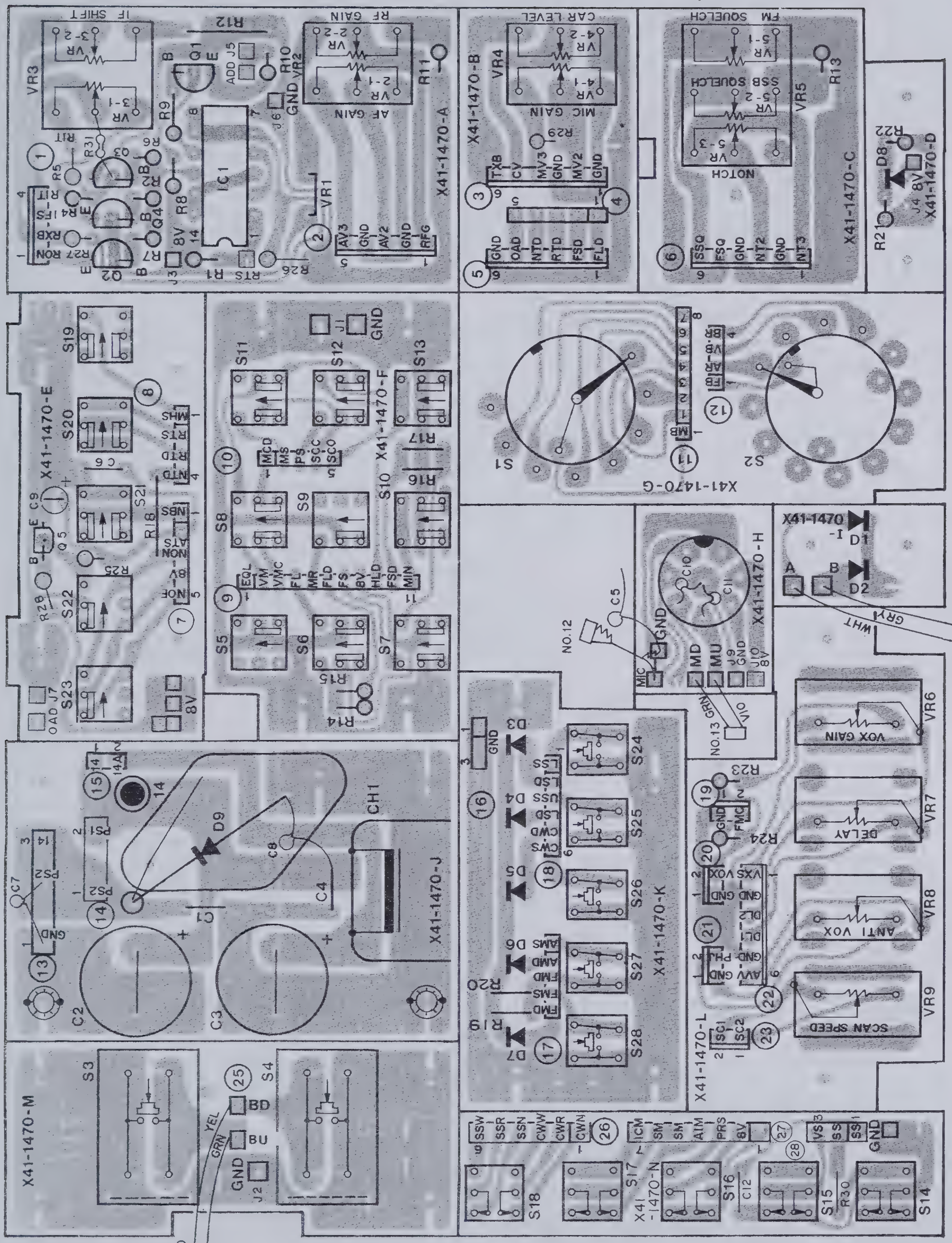


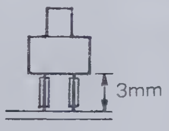
TS-430S PC BOARD VIEW

SWITCH UNIT (X41-1470-00) **Component side view**

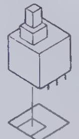


Q1–4 : 2SC945(R) Q5 : 2SC1815(Y)
D1,2,6–8 : SY438D D3–5 : SG238D D9 : S31C(S)
IC1 : TC4011BP

<Attachment method of D1–8>



<Attachment direction of S5–13,19–23>



PARTS LIST

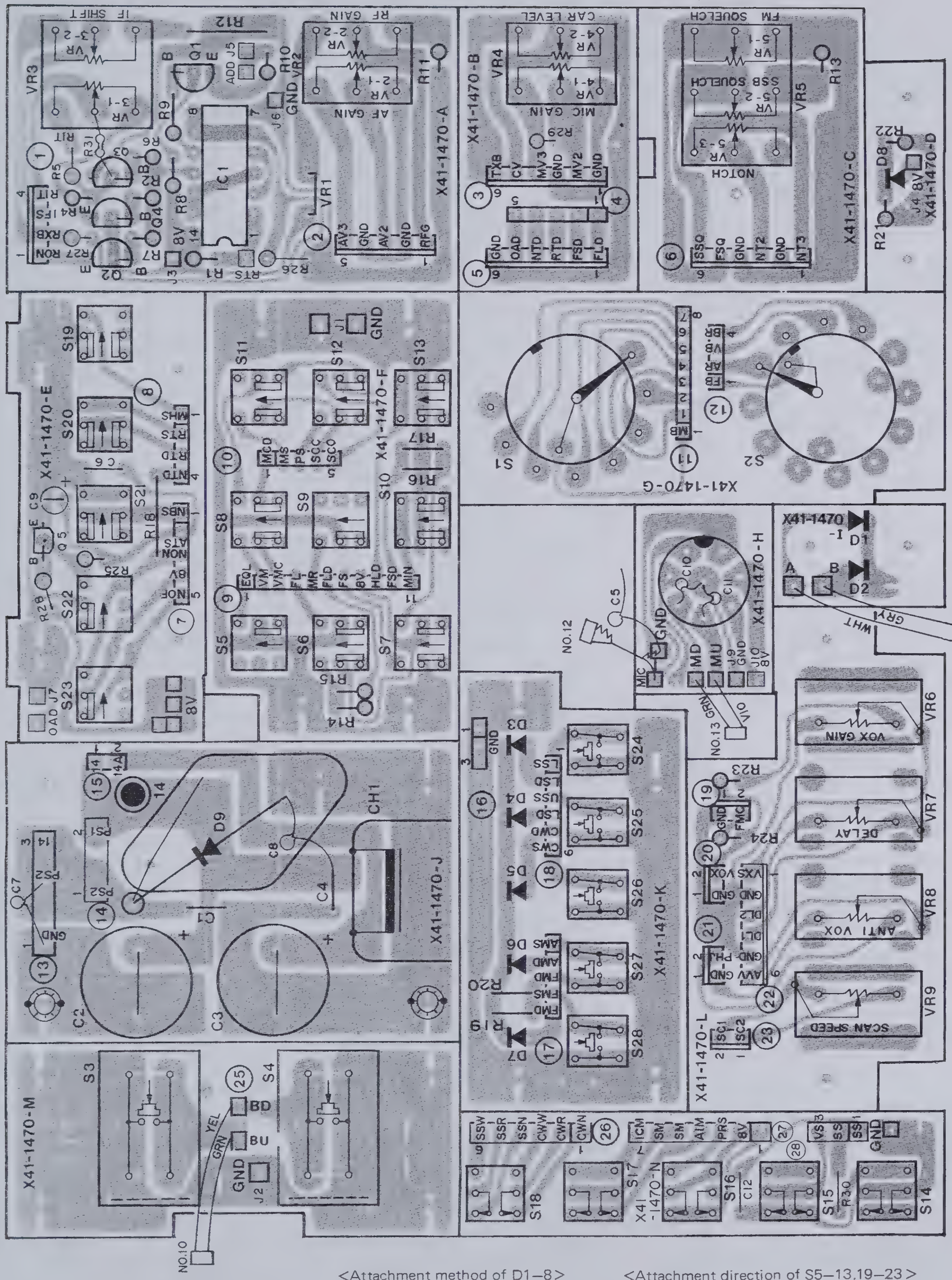
Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1A101M		E 100 10V	C48,79,118,119, 175	5
CE04W1A470M		E 47 10V	C75,147,151,163	4
CE04W1H010M		E 1 50V	C148,174	2
CE04W1H3R3M		E 3.3 50V	C150	1
CE04W1HR47M		E 0.47 50V	C129,195,196,149	4
CK45B1H102K		C 0.001	C34,155,158–162, 202,205,212	10
CK45B1H222K		C 0.0022	C52,80	2
CK45B1H471K		C 470P	C132,142	2
CK45F1H103Z		C 0.01	C1,7–11,13–15,19 –23,27,35,37,44, 45,59–65,69–72, 81,87–89,91,95, 102,103,104,109, 111,113,123,125, 128,130,131,134, 137,138,141,145, 146,165–173,177, 180–194,200,201, 206,209,210	83
CK45F1H223Z		C 0.022	C197	1
CQ92M1H102K		ML 0.001	C50	1
CQ02M1H104K		ML 0.1	C51	1
CQ92M1H152K		ML 0.0015	C76	1
CQ92M1H683K		ML 0.068	C77	1
CQ92M1H822K		ML 0.0082	C154	1
C91-0131-05		C 0.01	C203	1
C91-0456-05		C 0.047	C2,28,46,49,73, 74,78,90,96–99, 120,121,122,156, 164,176,198,199, 204,207,208	23
C91-0457-05		C 0.022	C153,157	2
E04-0157-05		Mini pin jack A		1
E23-0046-04		Square terminal		5
E40-0273-05		Mini connector 2P		8
E40-0274-05		Mini connector 2P		1
E40-0373-05		Mini connector 3P		4
E40-0473-05		Mini connector 4P		8
E40-0573-05		Mini connector 5P		4
E40-0673-05		Mini connector 6P		1
E40-0773-05		Mini connector 7P		2
E40-0873-05		Mini connector 8P		1
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7
L32-0198-05		OSC coil	L10	1
L32-0201-05		OSC coil 8.83MHz	T14	1
L32-0639-05		OSC coil	L18	1
L33-0636-05		Choke coil 28μH	L31	1
L33-0663-05	N	Choke coil 1μH	L12	1
L33-0664-05	N	Choke coil 2.7μH	L22	1
L33-0665-05	N	Choke coil 39μH	L23	1
L34-2140-05	N	Tuning coil 9.67MHz	T10	1
L34-2141-05	N	Tuning coil 9MHz	T12,13	2
L34-3064-05	N	BPF coil 43MHz	T1,3,4,6	4
L34-3065-05	N	BPF coil 43MHz	T2	1
L34-3066-05	N	BPF coil 34MHz	T5	1
L34-3067-05	N	BPF coil 42.5MHz	T7,9	2
L34-3068-05	N	BPF coil 42.5MHz	T8	1
L40-4011-03		Ferri-inductor 100μH	L1,4–7,11, 13–15,17,27,35	12
L33-0672-05		Ferri-inductor 100μH	L36–41	6
L40-1011-04		Ferri-inductor 100μH	L25,26	2
L40-1021-03		Ferri-inductor 1mH	L8,9	2
L40-1511-03		Ferri-inductor 150μH	L34,43	2
L40-2201-03		Ferri-inductor 22μH	L2,3,42	3
L40-2211-03		Ferri-inductor 220μH	L16,19,20,24,30 32,33	7
L40-4711-03		Ferri-inductor 470μH	L21,28,29	3
L72-0336-05	N	Ceramic filter 9.65MHz	CF1	1
L77-0485-05		Crystal 8.8315MHz	X2	1
L77-0486-05		Crystal 8.8285MHz	X1	1
L77-0978-05	N	Crystal 36MHz	X4	1
L77-0979-05	N	Crystal 39.225MHz	X5	1
L77-0980-05	N	Crystal 8.7915MHz	X3	1
L77-0981-05	N	Crystal 9MHz	X6	1
L78-0005-05		Ceramic OSC 5.75MHz	X7	1
R12-1038-05		Trim. pot. 1kΩ	VR1,2	2
R12-1040-05		Trim. pot. 4.7kΩ	VR3	1
R90-0515-05		Resistor block 10kΩ x 4	RB1	1
R90-0561-05	N	Resistor block 22kΩ x 6	RB3	1
R90-0562-05	N	Resistor block 22kΩ x 8	RB2	1
R92-0150-05		Short jumper		94
S31-1005-05		Slide switch	S1	1

DISPLAY UNIT (X54-1710-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W0J221M		E 220 6.3V	C2	1
CE04W1A470M		E 47 10V	C1	1
CE04W1V100M		E 10 35V	C3,5–7	4
CQ92M1H103K		ML 0.01	C4	1
C91-0456-05		C 0.047	C8	1
E40-0273-05		Mini connector 2P		1
E40-0473-05		Mini connector 4P		1
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		1
L19-0305-05		OSC transf.	T1	1
L40-1011-04		Ferri-inductor 100μH	L1	1
L40-1511-03		Ferri-inductor 150μH	L2	1
N30-2604-46		Round screw 2.6 x 4		6
N87-3006-46		Self tapping screw 3 x 6		2
R90-0511-05		Resistor block 47kΩ x 8	RB1	1
R90-0521-05		Resistor block 47kΩ x 7	RB2	1
R92-0150-05		Short jumper		11

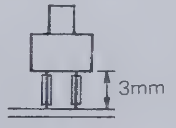
TS-430S PC BOARD VIEW

SWITCH UNIT (X41-1470-00) Component side view

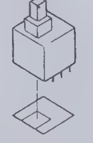


Q1–4 : 2SC945(R) Q5 : 2SC1815(Y)
D1,2,6–8 : SY438D D3–5 : SG238D D9 : S31C(S)
IC1 : TC4011BP

<Attachment method of D1–8>



<Attachment direction of S5–13,19–23>



PARTS LIST

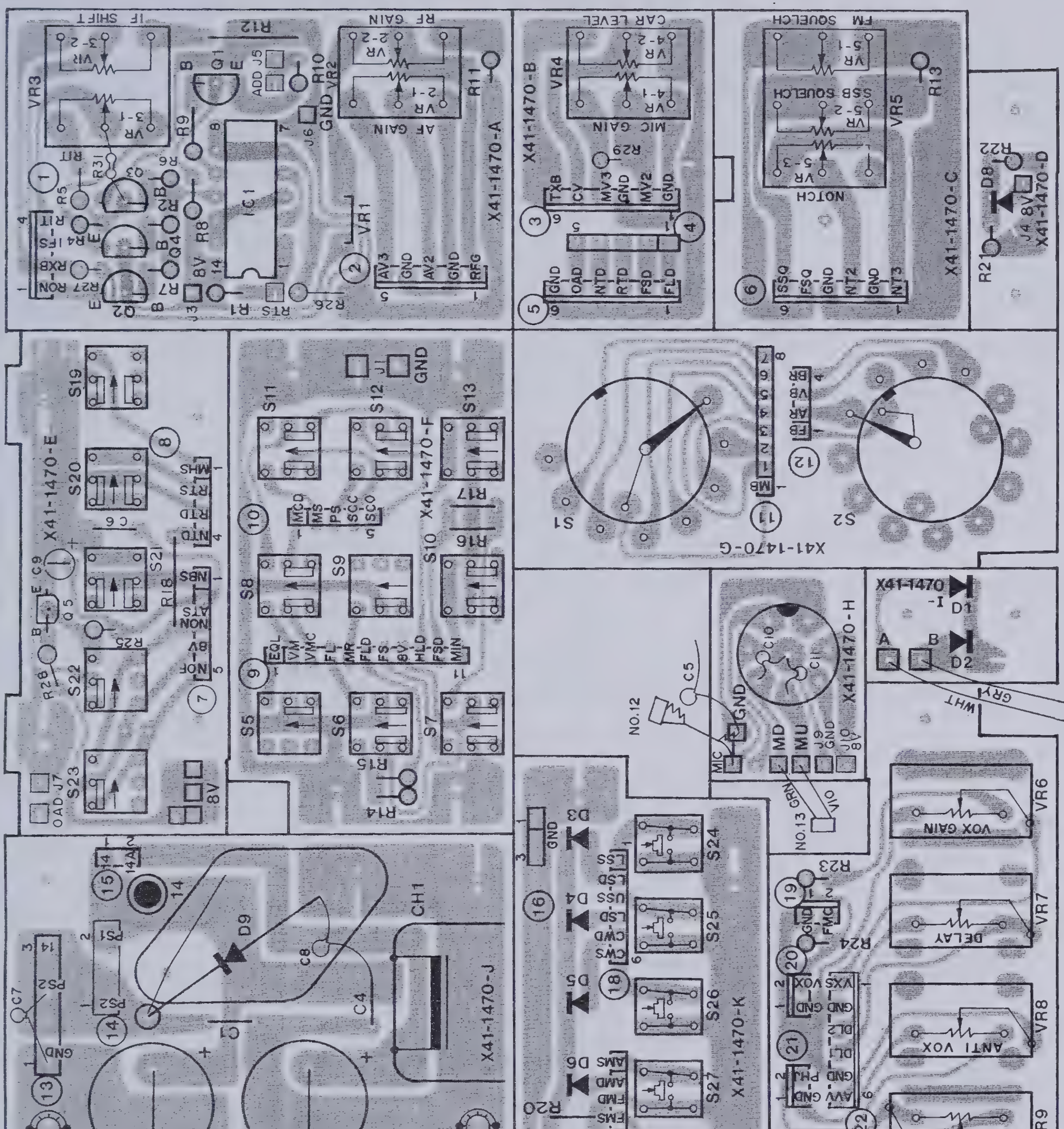
Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1A101M		E 100 10V	C48,79,118,119, 175	5
CE04W1A470M		E 47 10V	C75,147,151,163	4
CE04W1H010M		E 1 50V	C148,174	2
CE04W1H3R3M		E 3.3 50V	C150	1
CE04W1HR47M		E 0.47 50V	C129,195,196,149	4
CK45B1H102K		C 0.001	C34,155,158–162, 202,205,212	10
CK45B1H222K		C 0.0022.	C52,80	2
CK45B1H471K		C 470P	C132,142	2
CK45F1H103Z		C 0.01	C1,7–11,13–15,19 –23,27,35,37,44, 45,59–65,69–72, 81,87–89,91,95, 102,103,104,109, 111,113,123,125, 128,130,131,134, 137,138,141,145, 146,165–173,177, 180–194,200,201, 206,209,210	83
CK45F1H223Z		C 0.022	C197	1
CQ92M1H102K		ML 0.001	C50	1
CQ02M1H104K		ML 0.1	C51	1
CQ92M1H152K		ML 0.0015	C76	1
CQ92M1H683K		ML 0.068	C77	1
CQ92M1H822K		ML 0.0082	C154	1
C91-0131-05		C 0.01	C203	1
C91-0456-05		C 0.047	C2,28,46,49,73, 74,78,90,96–99, 120,121,122,156, 164,176,198,199, 204,207,208	23
C91-0457-05		C 0.022	C153,157	2
E04-0157-05		Mini pin jack A		1
E23-0046-04		Square terminal		5
E40-0273-05		Mini connector 2P		8
E40-0274-05		Mini connector 2P		1
E40-0373-05		Mini connector 3P		4
E40-0473-05		Mini connector 4P		8
E40-0573-05		Mini connector 5P		4
E40-0673-05		Mini connector 6P		1
E40-0773-05		Mini connector 7P		2
E40-0873-05		Mini connector 8P		1
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7
L32-0198-05		OSC coil	L10	1
L32-0201-05		OSC coil 8.83MHz	T14	1
L32-0639-05		OSC coil	L18	1
L33-0636-05		Choke coil 28μH	L31	1
L33-0663-05	N	Choke coil 1μH	L12	1
L33-0664-05	N	Choke coil 2.7μH	L22	1
L33-0665-05	N	Choke coil 39μH	L23	1
L34-2140-05	N	Tuning coil 9.67MHz	T10	1
L34-2141-05	N	Tuning coil 9MHz	T12,13	2
L34-3064-05	N	BPF coil 43MHz	T1,3,4,6	4
L34-3065-05	N	BPF coil 43MHz	T2	1
L34-3066-05	N	BPF coil 34MHz	T5	1
L34-3067-05	N	BPF coil 42.5MHz	T7,9	2
L34-3068-05	N	BPF coil 42.5MHz	T8	1
L40-1011-03		Ferri-inductor 100μH	L1,4–7,11, 13–15,17,27,35	12
L33-0672-05		Ferri-inductor 100μH	L36–41	6
L40-1011-04		Ferri-inductor 100μH	L25,26	2
L40-1021-03		Ferri-inductor 1mH	L8,9	2
L40-1511-03		Ferri-inductor 150μH	L34,43	2
L40-2201-03		Ferri-inductor 22μH	L2,3,42	3
L40-2211-03		Ferri-inductor 220μH	L16,19,20,24,30 32,33	7
L40-4711-03		Ferri-inductor 470μH	L21,28,29	3
L72-0336-05	N	Ceramic filter 9.65MHz	CF1	1
L77-0485-05		Crystal 8.8315MHz	X2	1
L77-0486-05		Crystal 8.8285MHz	X1	1
L77-0978-05	N	Crystal 36MHz	X4	1
L77-0979-05	N	Crystal 39.225MHz	X5	1
L77-0980-05	N	Crystal 8.7915MHz	X3	1
L77-0981-05	N	Crystal 9MHz	X6	1
L78-0005-05		Ceramic OSC 5.75MHz	X7	1
R12-1038-05		Trim. pot. 1kΩ	VR1,2	2
R12-1040-05		Trim. pot. 4.7kΩ	VR3	1
R90-0515-05		Resistor block 10kΩ x 4	RB1	1
R90-0561-05	N	Resistor block 22kΩ x 6	RB3	1
R90-0562-05	N	Resistor block 22kΩ x 8	RB2	1
R92-0150-05		Short jumper		94
S31-1005-05		Slide switch	S1	1

DISPLAY UNIT (X54-1710-00)

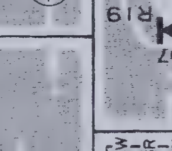
Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W0J221M		E 220 6.3V	C2	1
CE04W1A470M		E 47 10V	C1	1
CE04W1V100M		E 10 35V	C3,5–7	4
CQ92M1H103K		ML 0.01	C4	1
C91-0456-05		C 0.047	C8	1
E40-0273-05		Mini connector 2P		1
E40-0473-05		Mini connector 4P		1
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		1
L19-0305-05		OSC transf.	T1	1
L40-1011-04		Ferri-inductor 100μH	L1	1
L40-1511-03		Ferri-inductor 150μH	L2	1
N30-2604-46		Round screw 2.6 x 4		6
N87-3006-46		Self tapping screw 3 x 6		2
R90-0511-05		Resistor block 47kΩ x 8	RB1	1
R90-0521-05		Resistor block 47kΩ x 7	RB2	1
R92-0150-05		Short jumper		11

TS-430S PC BOARD VIEW

SWITCH UNIT (X41-1470-00) **Component side view**



<Attachment method of D1–8>



<Attachment direction of S5–13,19–23>

Q1–4 : 2SC945(R) Q5 : 2SC1815(Y)
D1,2,6–8 : SY438D D3–5 : SG238D D9 : S31C(S)
IC1 : TC4011BP

PARTS LIST

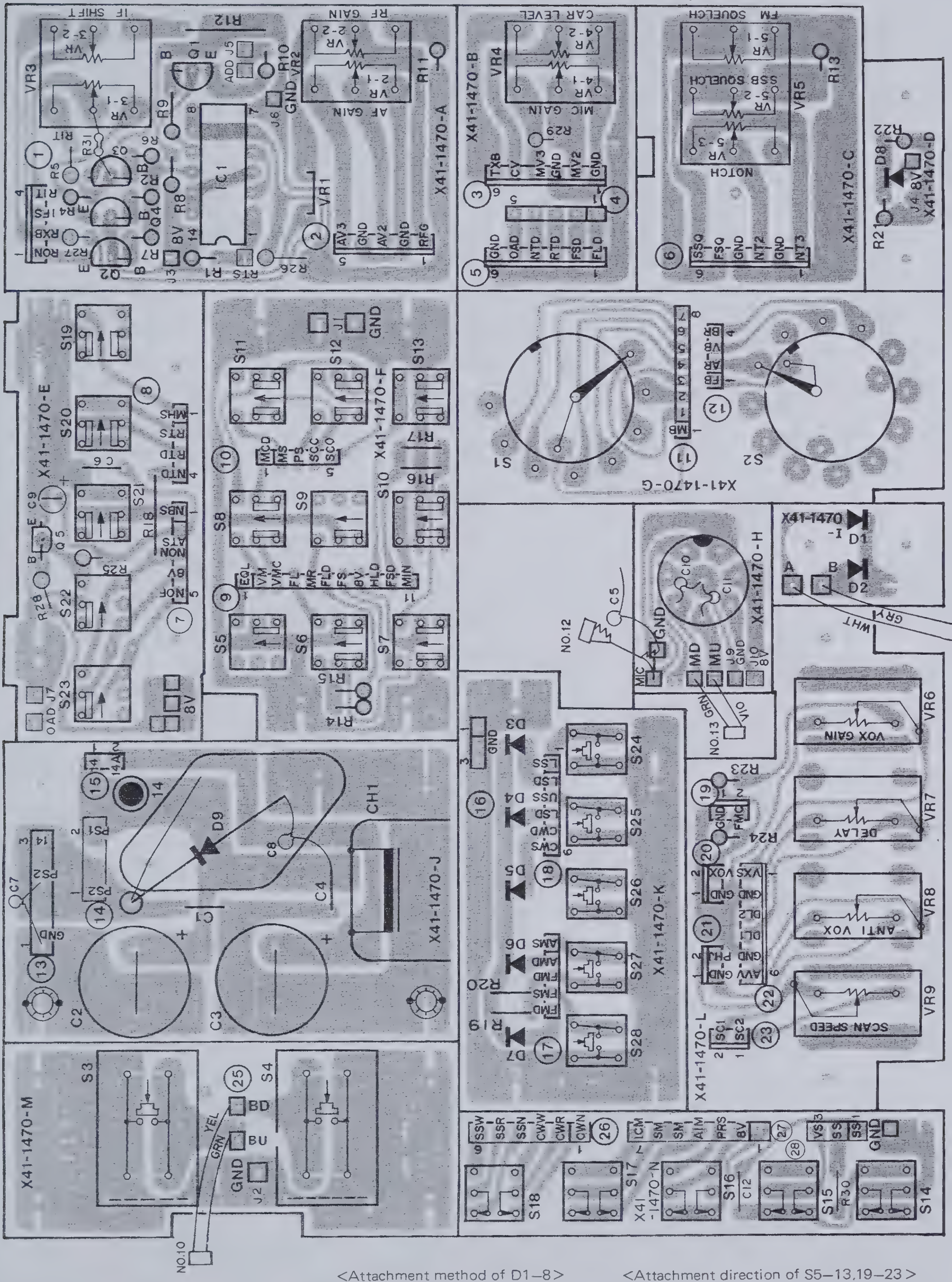
Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1A101M		E 100 10V	C48,79,118,119, 175	5
CE04W1A470M		E 47 10V	C75,147,151,163	4
CE04W1H010M		E 1 50V	C148,174	2
CE04W1H3R3M		E 3.3 50V	C150	1
CE04W1HR47M		E 0.47 50V	C129,195,196,149	4
CK45B1H102K		C 0.001	C34,155,158–162, 202,205,212	10
CK45B1H222K		C 0.0022	C52,80	2
CK45B1H471K		C 470P	C132,142	2
CK45F1H103Z		C 0.01	C1,7–11,13–15,19 –23,27,35,37,44, 45,59–65,69–72, 81,87–89,91,95, 102,103,104,109, 111,113,123,125, 128,130,131,134, 137,138,141,145, 146,165–173,177, 180–194,200,201, 206,209,210	83
CK45F1H223Z		C 0.022	C197	1
CQ92M1H102K		ML 0.001	C50	1
CQ02M1H104K		ML 0.1	C51	1
CQ92M1H152K		ML 0.0015	C76	1
CQ92M1H683K		ML 0.068	C77	1
CQ92M1H822K		ML 0.0082	C154	1
C91-0131-05		C 0.01	C203	1
C91-0456-05		C 0.047	C2,28,46,49,73, 74,78,90,96–99, 120,121,122,156, 164,176,198,199, 204,207,208	23
C91-0457-05		C 0.022	C153,157	2
E04-0157-05		Mini pin jack A		1
E23-0046-04		Square terminal		5
E40-0273-05		Mini connector 2P		8
E40-0274-05		Mini connector 2P		1
E40-0373-05		Mini connector 3P		4
E40-0473-05		Mini connector 4P		8
E40-0573-05		Mini connector 5P		4
E40-0673-05		Mini connector 6P		1
E40-0773-05		Mini connector 7P		2
E40-0873-05		Mini connector 8P		1
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7
L32-0198-05		OSC coil	L10	1
L32-0201-05		OSC coil 8.83MHz	T14	1
L32-0639-05		OSC coil	L18	1
L33-0636-05		Choke coil 28μH	L31	1
L33-0663-05	N	Choke coil 1μH	L12	1
L33-0664-05	N	Choke coil 2.7μH	L22	1
L33-0665-05	N	Choke coil 39μH	L23	1
L34-2140-05	N	Tuning coil 9.67MHz	T10	1
L34-2141-05	N	Tuning coil 9MHz	T12,13	2
L34-3064-05	N	BPF coil 43MHz	T1,3,4,6	4
L34-3065-05	N	BPF coil 43MHz	T2	1
L34-3066-05	N	BPF coil 34MHz	T5	1
L34-3067-05	N	BPF coil 42.5MHz	T7,9	2
L34-3068-05	N	BPF coil 42.5MHz	T8	1
L40-1011-03		Ferri-inductor 100μH	L1,4–7,11, 13–15,17,27,35	12
L33-0672-05		Ferri-inductor 100μH	L36–41	6
L40-1011-04		Ferri-inductor 100μH	L25,26	2
L40-1021-03		Ferri-inductor 1mH	L8,9	2
L40-1511-03		Ferri-inductor 150μH	L34,43	2
L40-2201-03		Ferri-inductor 22μH	L2,3,42	3
L40-2211-03		Ferri-inductor 220μH	L16,19,20,24,30 32,33	7
L40-4711-03		Ferri-inductor 470μH	L21,28,29	3
L72-0336-05	N	Ceramic filter 9.65MHz	CF1	1
L77-0485-05		Crystal 8.8315MHz	X2	1
L77-0486-05		Crystal 8.8285MHz	X1	1
L77-0978-05	N	Crystal 36MHz	X4	1
L77-0979-05	N	Crystal 39.225MHz	X5	1
L77-0980-05	N	Crystal 8.7915MHz	X3	1
L77-0981-05	N	Crystal 9MHz	X6	1
L78-0005-05		Ceramic OSC 5.75MHz	X7	1
R12-1038-05		Trim. pot. 1kΩ	VR1,2	2
R12-1040-05		Trim. pot. 4.7kΩ	VR3	1
R90-0515-05		Resistor block 10kΩ x 4	RB1	1
R90-0561-05	N	Resistor block 22kΩ x 6	RB3	1
R90-0562-05	N	Resistor block 22kΩ x 8	RB2	1
R92-0150-05		Short jumper		94
S31-1005-05		Slide switch	S1	1

DISPLAY UNIT (X54-1710-00)

Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W0J221M		E 220 6.3V	C2	1
CE04W1A470M		E 47 10V	C1	1
CE04W1V100M		E 10 35V	C3,5–7	4
CQ92M1H103K		ML 0.01	C4	1
C91-0456-05		C 0.047	C8	1
E40-0273-05		Mini connector 2P		1
E40-0473-05		Mini connector 4P		1
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		1
L19-0305-05		OSC transf.	T1	1
L40-1011-04		Ferri-inductor 100μH	L1	1
L40-1511-03		Ferri-inductor 150μH	L2	1
N30-2604-46		Round screw 2.6 x 4		6
N87-3006-46		Self tapping screw 3 x 6		2
R90-0511-05		Resistor block 47kΩ x 8	RB1	1
R90-0521-05		Resistor block 47kΩ x 7	RB2	1
R92-0150-05		Short jumper		11

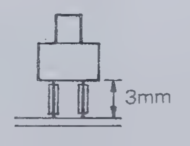
TS-430S PC BOARD VIEW

SWITCH UNIT (X41-1470-00) Component side view

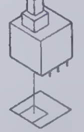


Q1–4 : 2SC945(R) Q5 : 2SC1815(Y)
D1,2,6–8 : SY438D D3–5 : SG238D D9 : S31C(S)
IC1 : TC4011BP

<Attachment method of D1–8>

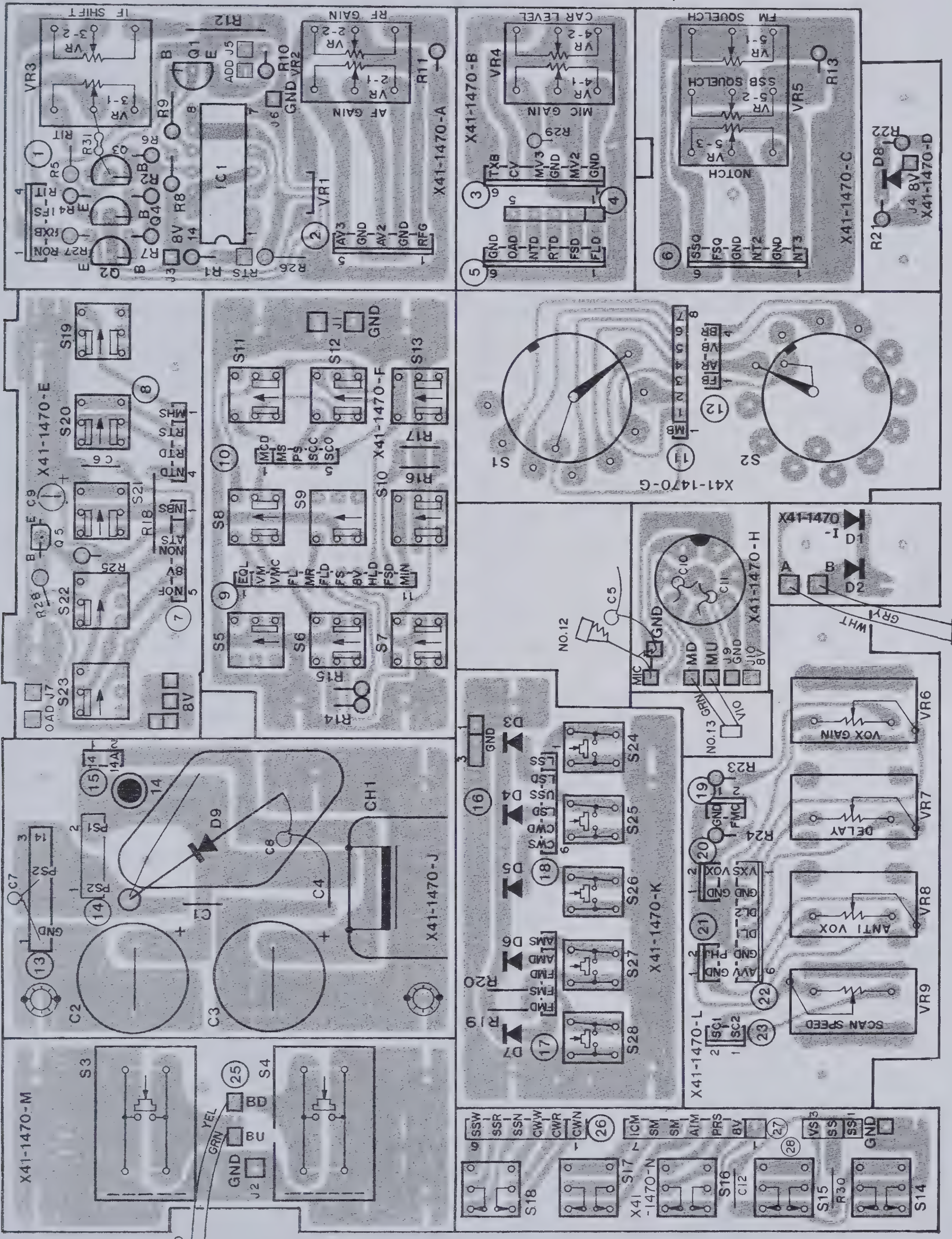


<Attachment direction of S5–13,19–23>



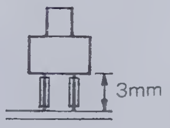
TS-430S PC BOARD VIEW

SWITCH UNIT (X41-1470-00) Component side view

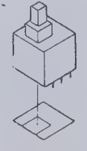


Q1–4 : 2SC945(R) Q5 : 2SC1815(Y)
D1,2,6–8 : SY438D D3–5 : SG238D D9 : S31C(S)
IC1 : TC4011BP

<Attachment method of D1–8>



<Attachment direction of S5–13,19–23>



PARTS LIST

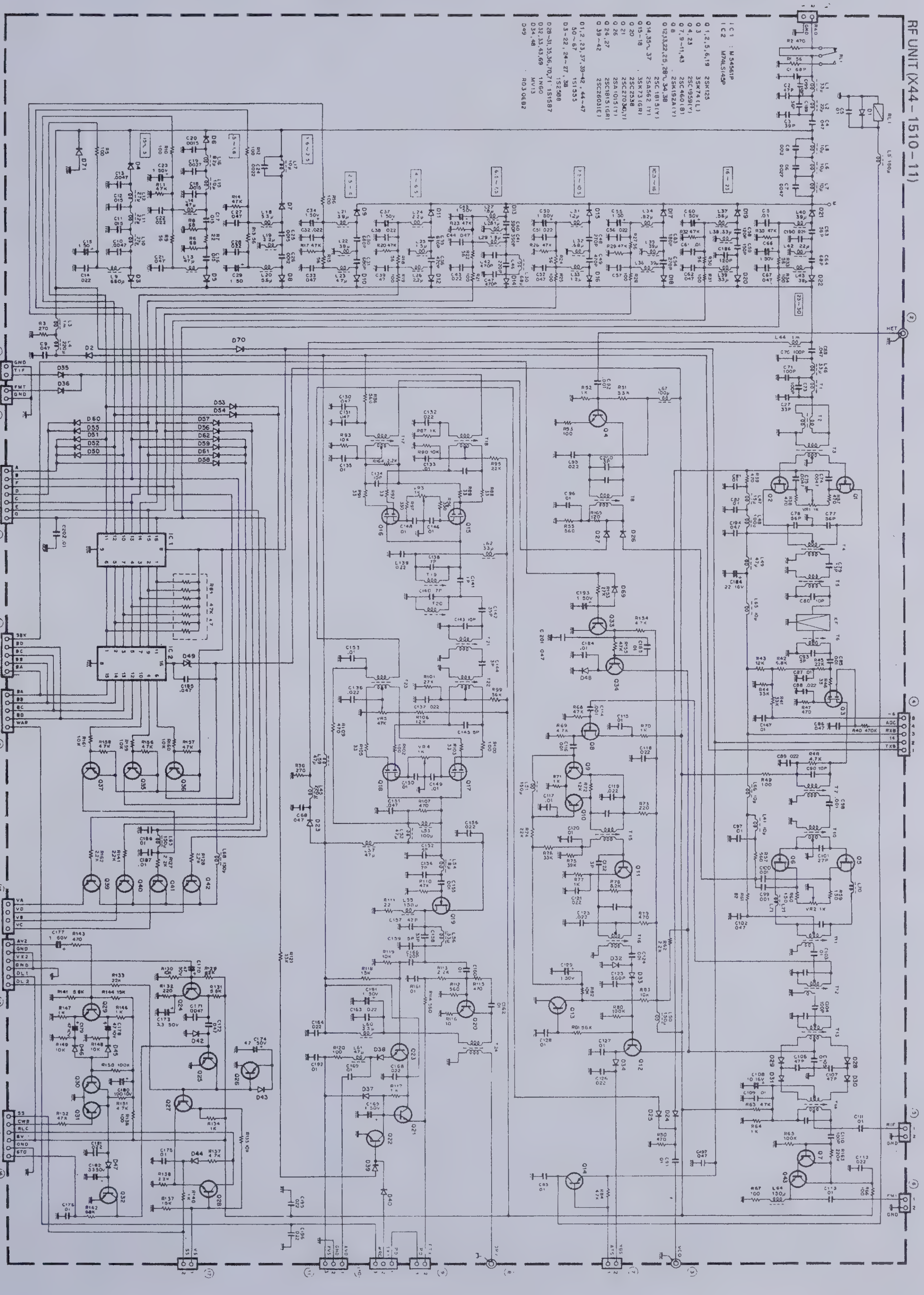
Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1A101M		E 100 10V	C48,79,118,119, 175	5
CE04W1A470M		E 47 10V	C75,147,151,163	4
CE04W1H010M		E 1 50V	C148,174	2
CE04W1H3R3M		E 3.3 50V	C150	1
CE04W1HR47M		E 0.47 50V	C129,195,196,149	4
CK45B1H102K		C 0.001	C34,155,158–162, 202,205,212	10
CK45B1H222K		C 0.0022	C52,80	2
CK45B1H471K		C 470P	C132,142	2
CK45F1H103Z		C 0.01	C1,7–11,13–15,19 –23,27,35,37,44, 45,59–65,69–72, 81,87–89,91,95, 102,103,104,109, 111,113,123,125, 128,130,131,134, 137,138,141,145, 146,165–173,177, 180–194,200,201, 206,209,210	83
CK45F1H223Z		C 0.022	C197	1
CQ92M1H102K		ML 0.001	C50	1
CQ02M1H104K		ML 0.1	C51	1
CQ92M1H152K		ML 0.0015	C76	1
CQ92M1H683K		ML 0.068	C77	1
CQ92M1H822K		ML 0.0082	C154	1
C91-0131-05		C 0.01	C203	1
C91-0456-05		C 0.047	C2,28,46,49,73, 74,78,90,96–99, 120,121,122,156, 164,176,198,199, 204,207,208	23
C91-0457-05		C 0.022	C153,157	2
E04-0157-05		Mini pin jack A		1
E23-0046-04		Square terminal		5
E40-0273-05		Mini connector 2P		8
E40-0274-05		Mini connector 2P		1
E40-0373-05		Mini connector 3P		4
E40-0473-05		Mini connector 4P		8
E40-0573-05		Mini connector 5P		4
E40-0673-05		Mini connector 6P		1
E40-0773-05		Mini connector 7P		2
E40-0873-05		Mini connector 8P		1
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7
L32-0198-05		OSC coil	L10	1
L32-0201-05		OSC coil 8.83MHz	T14	1
L32-0639-05		OSC coil	L18	1
L33-0636-05		Choke coil 28μH	L31	1
L33-0663-05	N	Choke coil 1μH	L12	1
L33-0664-05	N	Choke coil 2.7μH	L22	1
L33-0665-05	N	Choke coil 39μH	L23	1
L34-2140-05	N	Tuning coil 9.67MHz	T10	1
L34-2141-05	N	Tuning coil 9MHz	T12,13	2
L34-3064-05	N	BPF coil 43MHz	T1,3,4,6	4
L34-3065-05	N	BPF coil 43MHz	T2	1
L34-3066-05	N	BPF coil 34MHz	T5	1
L34-3067-05	N	BPF coil 42.5MHz	T7,9	2
L34-3068-05	N	BPF coil 42.5MHz	T8	1
L40-1011-03		Ferri-inductor 100μH	L1,4–7,11, 13–15,17,27,35	12
L33-0672-05		Ferri-inductor 100μH	L36–41	6
L40-1011-04		Ferri-inductor 100μH	L25,26	2
L40-1021-03		Ferri-inductor 1mH	L8,9	2
L40-1511-03		Ferri-inductor 150μH	L34,43	2
L40-2201-03		Ferri-inductor 22μH	L2,3,42	3
L40-2211-03		Ferri-inductor 220μH	L16,19,20,24,30 32,33	7
L40-4711-03		Ferri-inductor 470μH	L21,28,29	3
L72-0336-05	N	Ceramic filter 9.65MHz	CF1	1
L77-0485-05		Crystal 8.8315MHz	X2	1
L77-0486-05		Crystal 8.8285MHz	X1	1
L77-0978-05	N	Crystal 36MHz	X4	1
L77-0979-05	N	Crystal 39.225MHz	X5	1
L77-0980-05	N	Crystal 8.7915MHz	X3	1
L77-0981-05	N	Crystal 9MHz	X6	1
L78-0005-05		Ceramic OSC 5.75MHz	X7	1
R12-1038-05		Trim. pot. 1kΩ	VR1,2	2
R12-1040-05		Trim. pot. 4.7kΩ	VR3	1
R90-0515-05		Resistor block 10kΩ x 4	RB1	1
R90-0561-05	N	Resistor block 22kΩ x 6	RB3	1
R90-0562-05	N	Resistor block 22kΩ x 8	RB2	1
R92-0150-05		Short jumper		94
S31-1005-05		Slide switch	S1	1

DISPLAY UNIT (X54-1710-00)

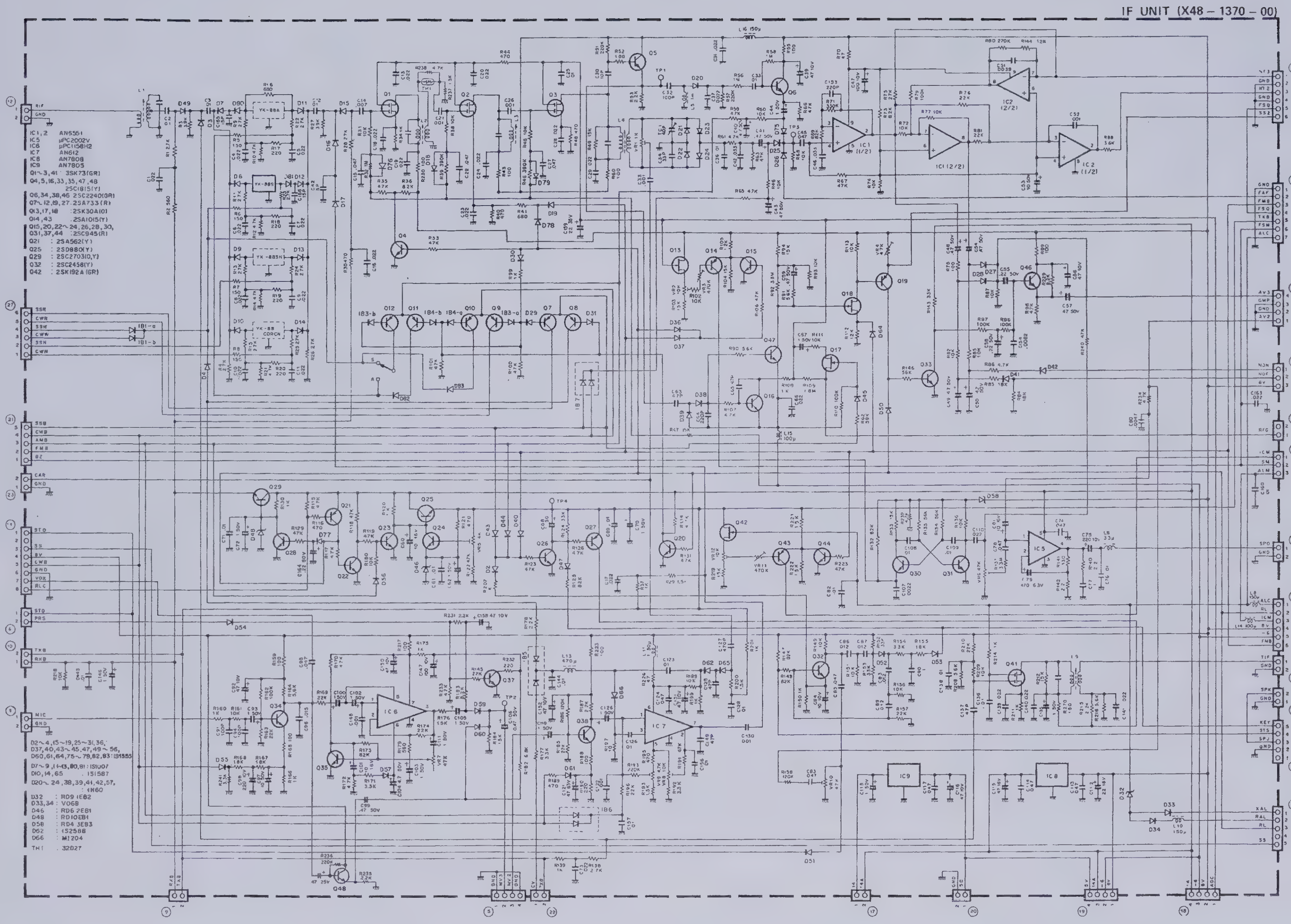
Part No.	Re-marks	Description	Ref. No.	Q'ty
CE04W0J221M		E 220 6.3V	C2	1
CE04W1A470M		E 47 10V	C1	1
CE04W1V100M		E 10 35V	C3,5–7	4
CQ92M1H103K		ML 0.01	C4	1
C91-0456-05		C 0.047	C8	1
E40-0273-05		Mini connector 2P		1
E40-0473-05		Mini connector 4P		1
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		1
L19-0305-05		OSC transf.	T1	1
L40-1011-04		Ferri-inductor 100μH	L1	1
L40-1511-03		Ferri-inductor 150μH	L2	1
N30-2604-46		Round screw 2.6 x 4		6
N87-3006-46		Self tapping screw 3 x 6		2
R90-0511-05		Resistor block 47kΩ x 8	RB1	1
R90-0521-05		Resistor block 47kΩ x 7	RB2	1
R92-0150-05		Short jumper		11

NO This
is
iNcomplete
only has INDEX
and Block
diagram/Schematic

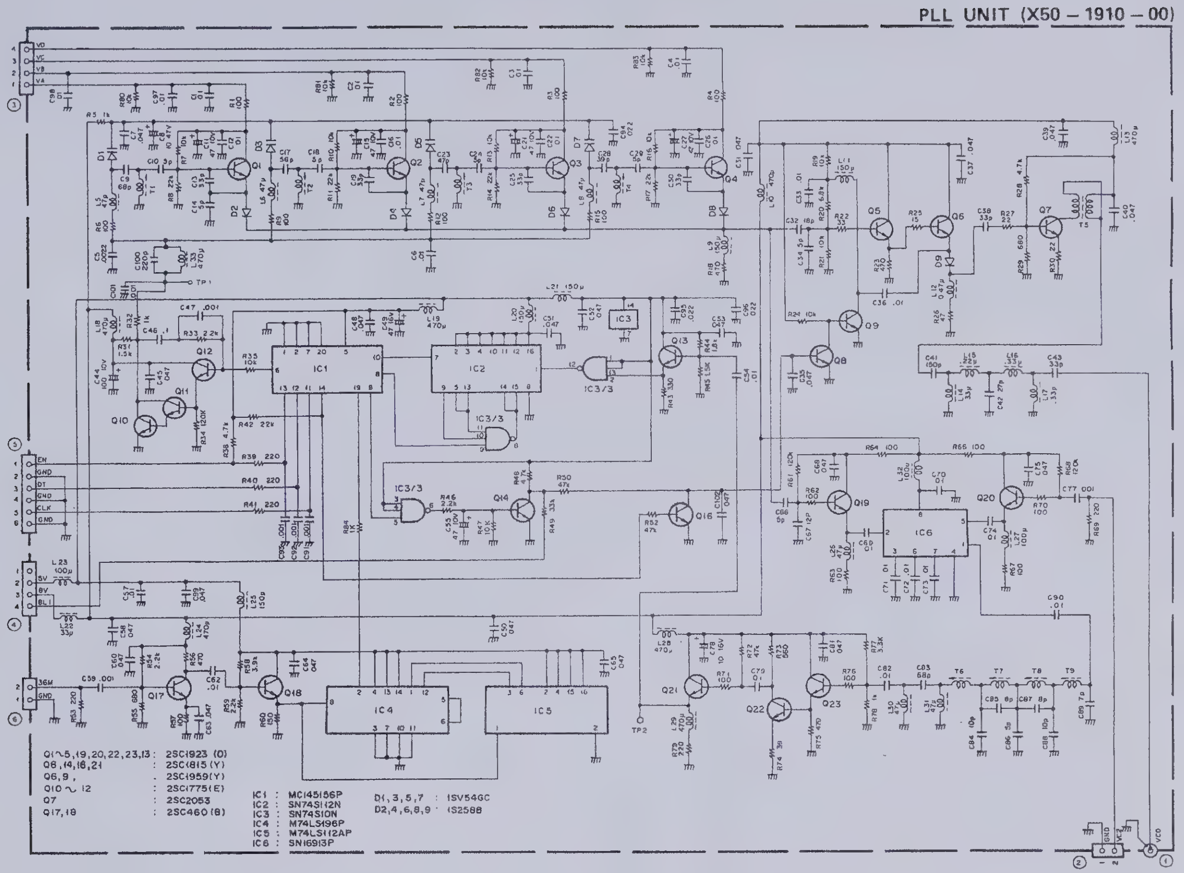
TS-430S RF UNIT (X44-1510-00/11)



TS-430S IF UNIT (X48-1370-00)



TS-430S PLL UNIT (X50-1910-00)

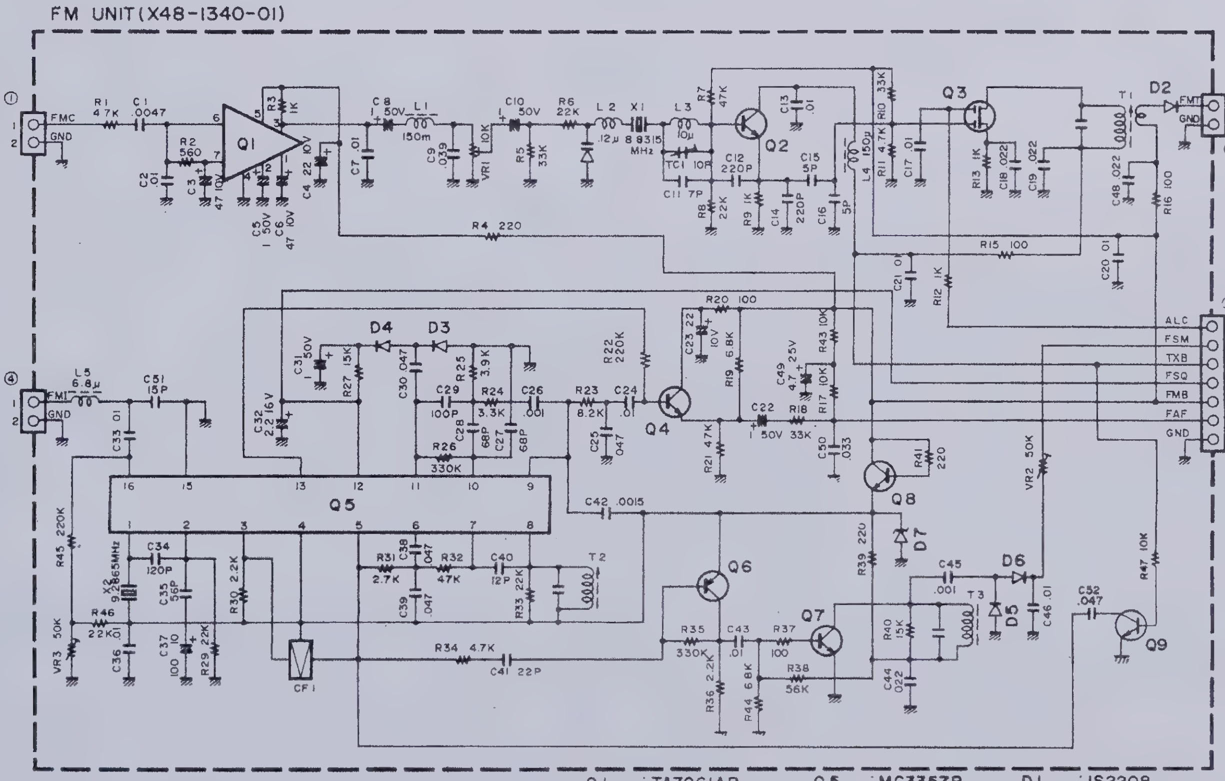


Q1~5,19,20,22,23,13 : 2SC1923 (O)
Q8,14,16,21 : 2SC1815 (Y)
Q6,9, . 2SC1959(Y)
Q10 ~ 12 : 2SC1775(E)
Q7 : 2SC2053
Q17,18 : 2SC460 (B)

IC1 : MC145156P
IC2 : SN74S112N
IC3 : SN74S10N
IC4 : M74LS196P
IC5 : M74LS112AP
IC6 : SN16913P

D1,3,5,7 : 1SV54GC
D2,4,6,8,9 · 1S2588

FM-430 (OPTION)

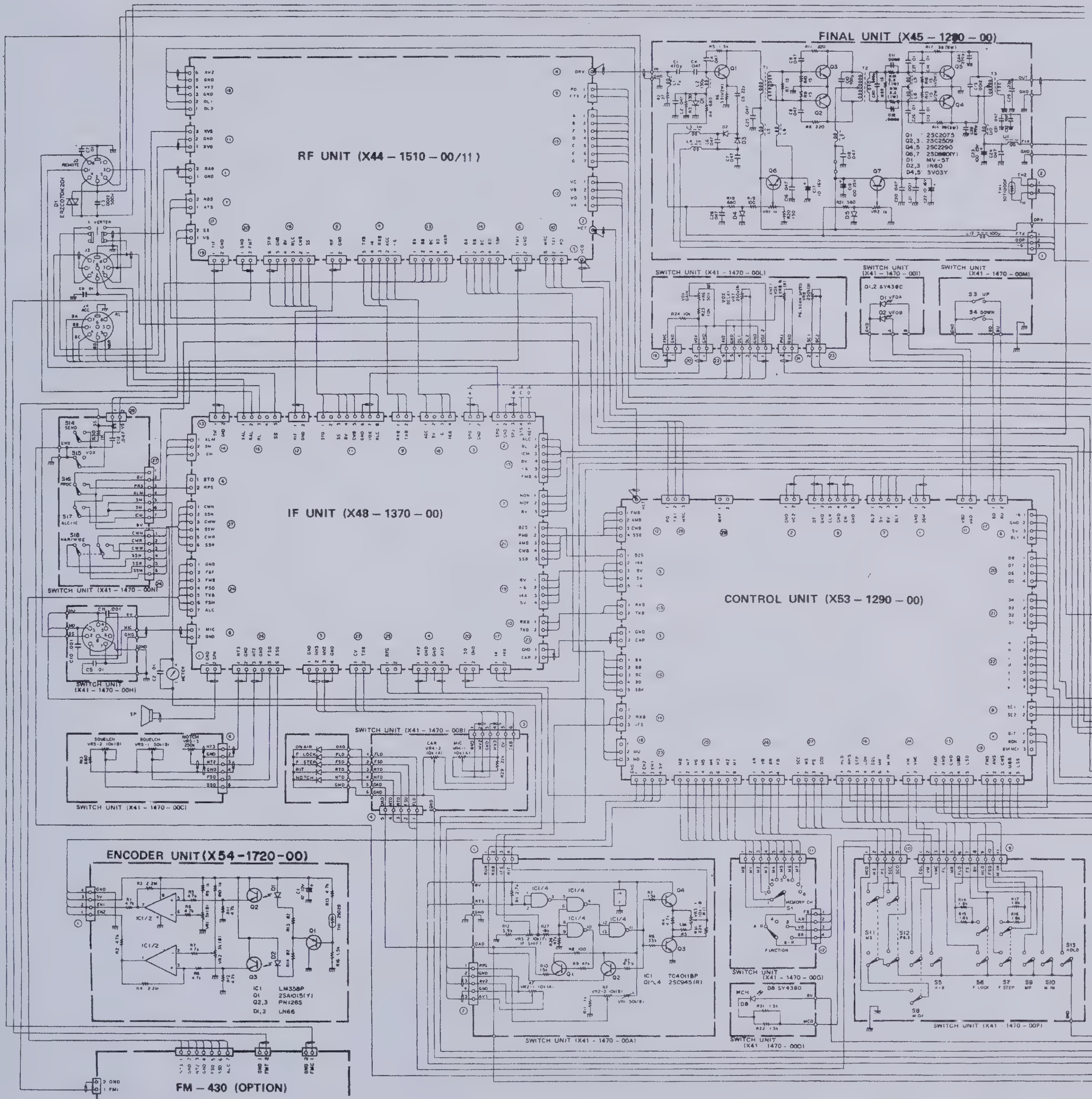


Q1 : TA7061AP
Q2 : 2SC460(B)
Q3 : 3SK73(GR)
Q4 : 2SC2240(GR)

Q5 : MC3357P
Q6 : 2SA1015(Y)
Q7~9: 2SC1815(Y)

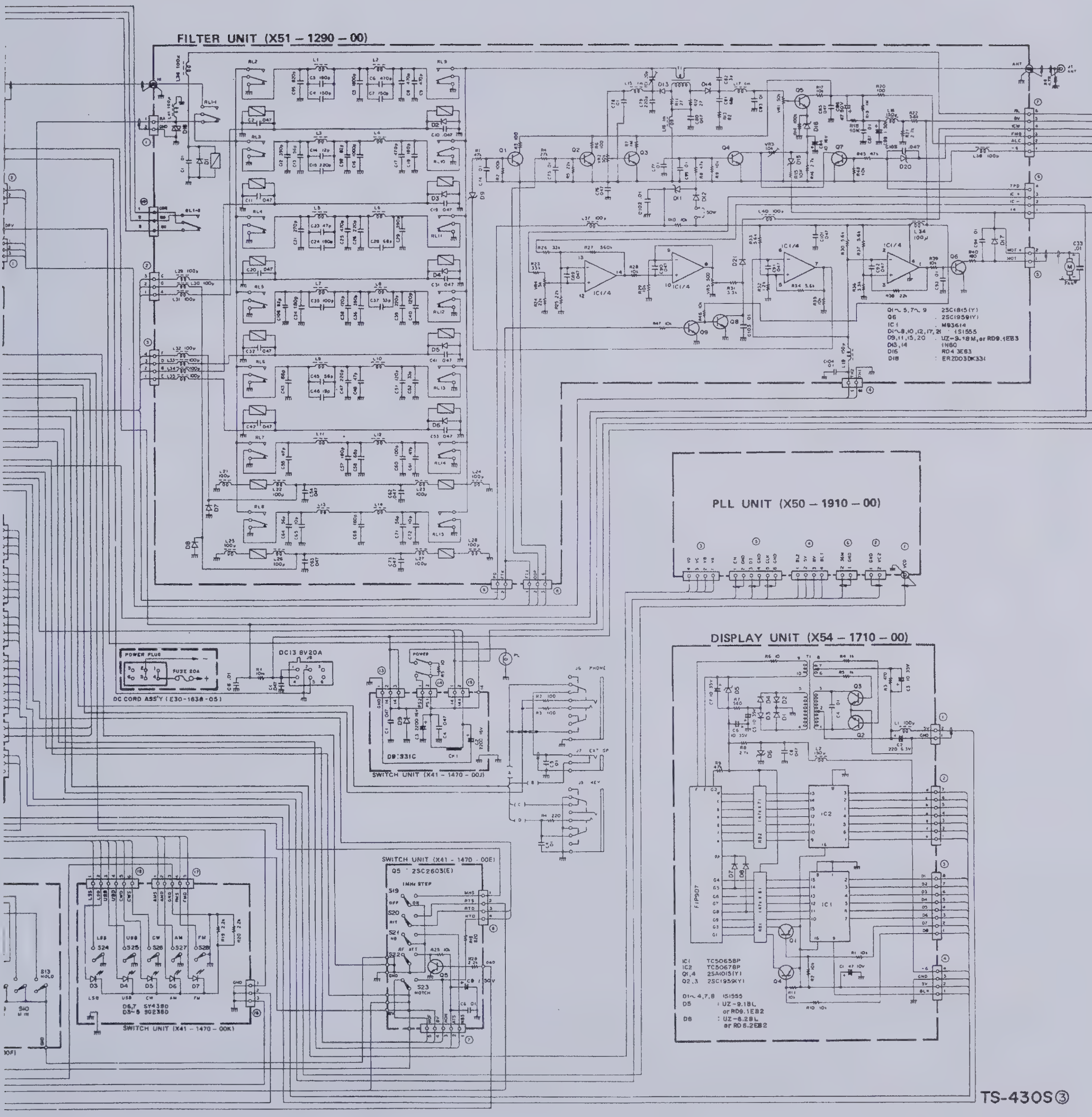
D1 : 1S2208
D2 : 1S1555
D3~6: 1N60
D7 : UZ-6.8BH
or MTZ 7.5JA

TS-430S SCHEMATIC DIAGRAM



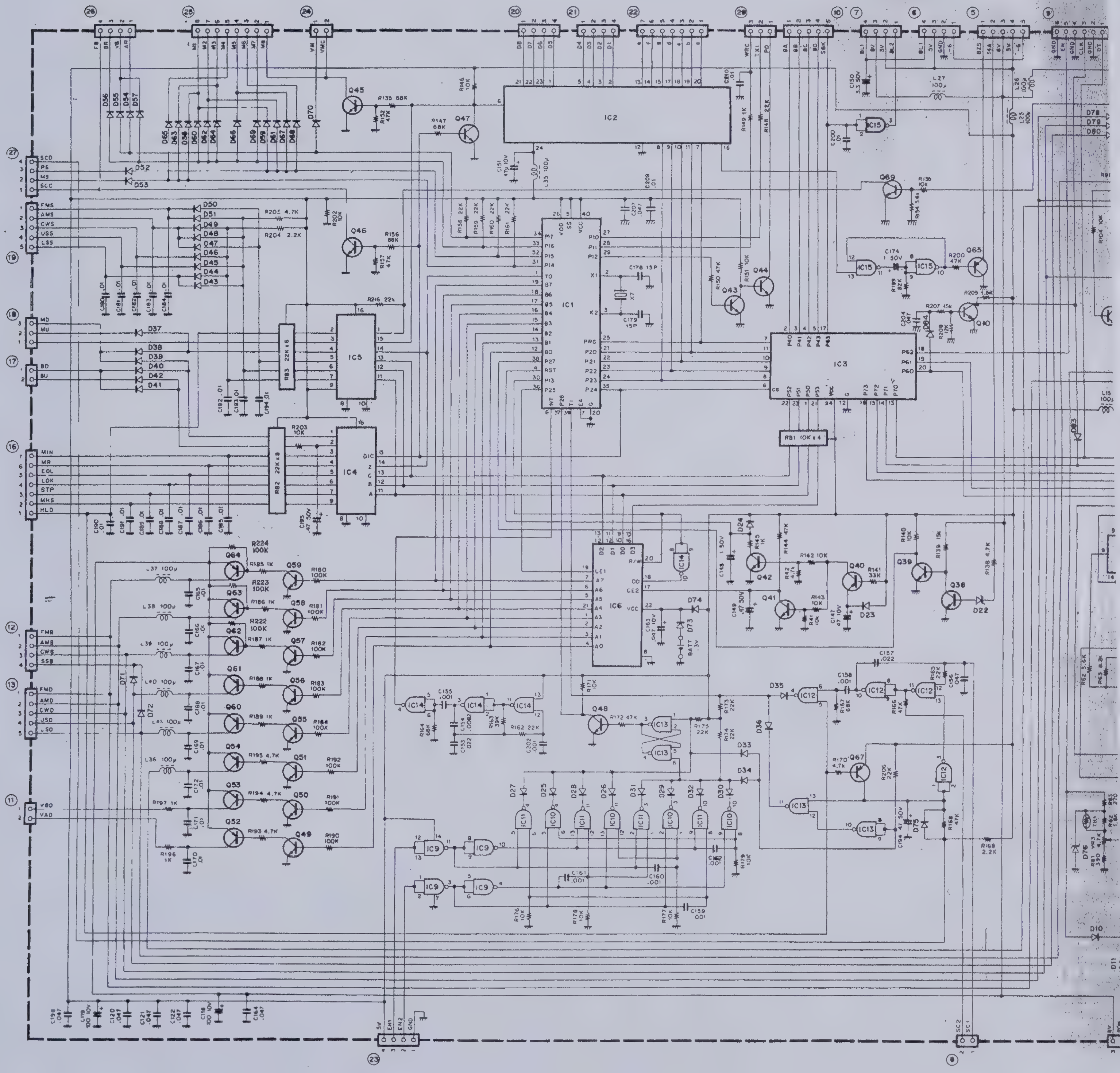
FINAL UNIT (X45 – 1280 – 00)
RF UNIT (X44 – 1510 – 00/11)
IF UNIT (X48 – 1370 – 00)
CONTROL UNIT (X53 – 1290 – 00)
ENCODER UNIT (X54-1720-00)
FM – 430 (OPTION)
SWITCH UNIT (X41 – 1470 – 00L)
SWITCH UNIT (X41 – 1470 – 00I)
SWITCH UNIT (X41 – 1470 – 00M)
SWITCH UNIT (X41 – 1470 – 00N)
SWITCH UNIT (X41 – 1470 – 00H)
SWITCH UNIT (X41 – 1470 – 00C)
SWITCH UNIT (X41 – 1470 – 00B)
SWITCH UNIT (X41 – 1470 – 00A)
SWITCH UNIT (X41 – 1470 – 00G)
SWITCH UNIT (X41 – 1470 – 00D)
SWITCH UNIT (X41 1470 – 00F)
Q1 2SC2075
Q2,3 2SC2509
Q4,5 2SC2290
Q6,7 2SD880(Y)
D1 MV-5T
D2,3 1N60
D4,5 SV03Y
IC1 LM358P
Q1 2SA1015(Y)
Q2,3 PN1265
D1,2 LN66
IC1 TC4011BP
Q1~4 2SC945(R)
D1,2 SY430C
D1 VFOA
D2 VFOB
S3 UP
S4 DOWN
S14 SEND
S15 VOX
S16 PROC
S17 ALC/IC
S18 NAR/WIDE
SQUELCH
NOTCH
METER
SP
ON AIR
F LOCK
F STEP
RIT
NOTCH
MEMORY CH
FUNCTION
S5 A=B
S6 F LOCK
S7 F STEP
S8 M.CH
S9 MR
S10 M.IN
S11 MS
S12 PB.S
S13 HOLD
MCH
D8 SY430B
REMOTE
VERTER
ACC
D1 ERZC07DK201

S

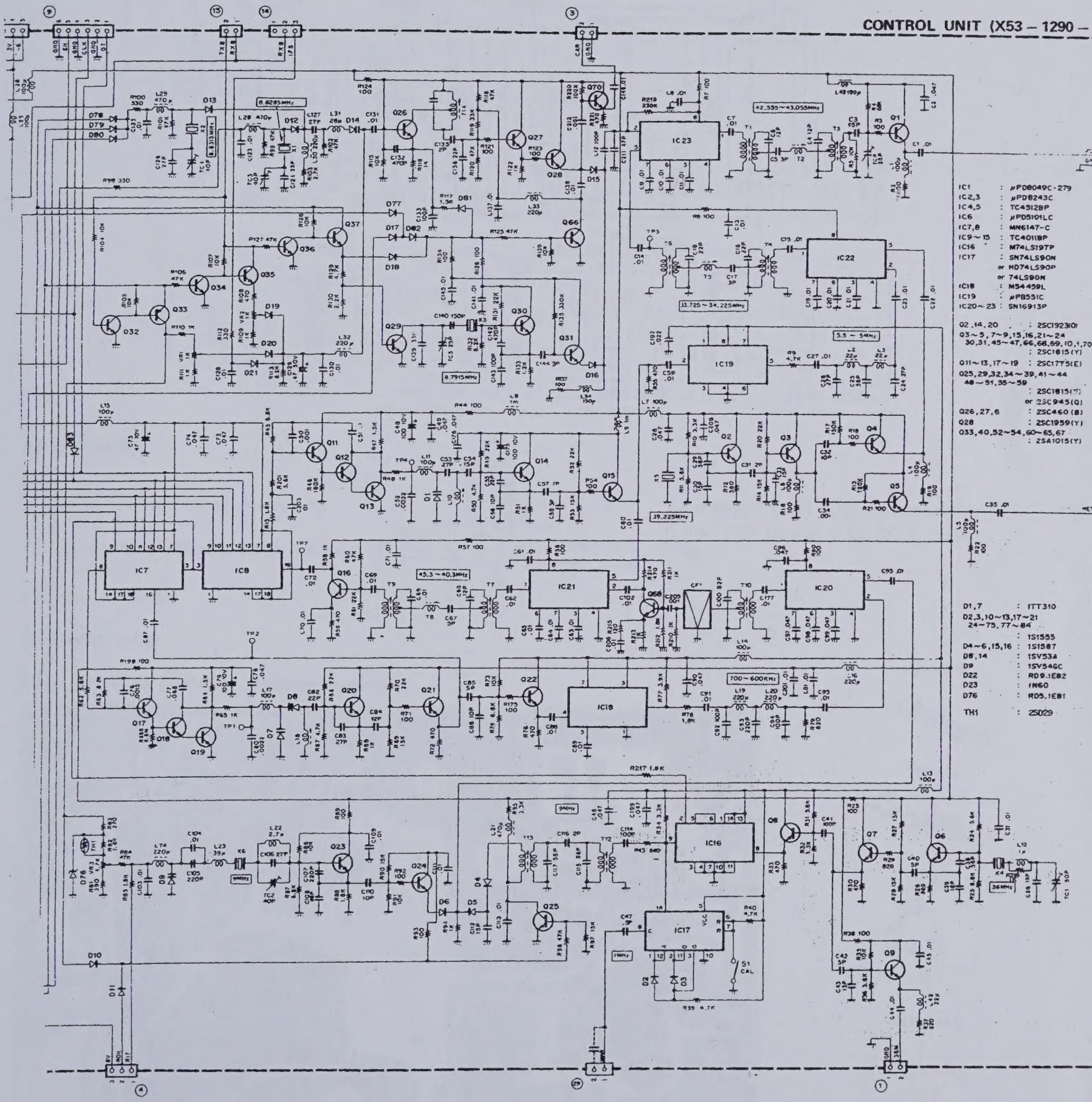

FILTER UNIT (X51 – 1290 – 00)
Q1～5, 7～9 : 2SC1815(Y)
Q6 . 2SC1959(Y)
IC1 . MB3614
D1～8, 10, 12, 17, 21 : 1S1555
D9, 11, 15, 20 . UZ-9.1BM, or RD9.1EB3
D13, 14 1N60
D16 RD4 3EB3
D18 : ER2D03DK33
ANT
FAN
PLL UNIT (X50 – 1910 – 00)
DISPLAY UNIT (X54 – 1710 – 00)
FIP9D7
IC1 TC50658P
IC2 TC50678P
Q1,4 2SA1015(Y)
Q2,3 2SC1959(Y)
D1～4,7,8 1S1555
D5 : UZ-9.1BL
or RD9.1EB2
D8 : UZ-6.2BL
or RD6.2EB2
POWER PLUG
FUSE 20A
DC CORD ASS'Y (E30-1638-05)
DC13.8V20A
SWITCH UNIT (X41 – 1470 – 00J)
D9:331C
PHONE
EXT SP
KEY
SWITCH UNIT (X41 - 1470 - 00E)
Q5 : 2SC2603(E)
1MHz STEP
RIT
NB
RF ATT
NOTCH
LSB
USB
CW
AM
FM
D3,7 SY4380
D3～6 SG2380
SWITCH UNIT (X41 – 1470 – 00K)
HOLD

TS-430S③

TS-430S SCHEMATIC DIAGRAM



CONTROL UNIT (X53 – 1290 –



IC1 : μPD8049C-279
IC2,3 : μPD8243C
IC4,5 : TC4512BP
IC6 : μPD5101LC
IC7,8 : MN6147-C
IC9～15 : TC4011BP
IC16 : M74LS197P
IC17 : SN74LS90N
or HD74LS90P
or 74LS90N
IC18 : M54459L
IC19 : μPB551C
IC20～23 : SN16913P

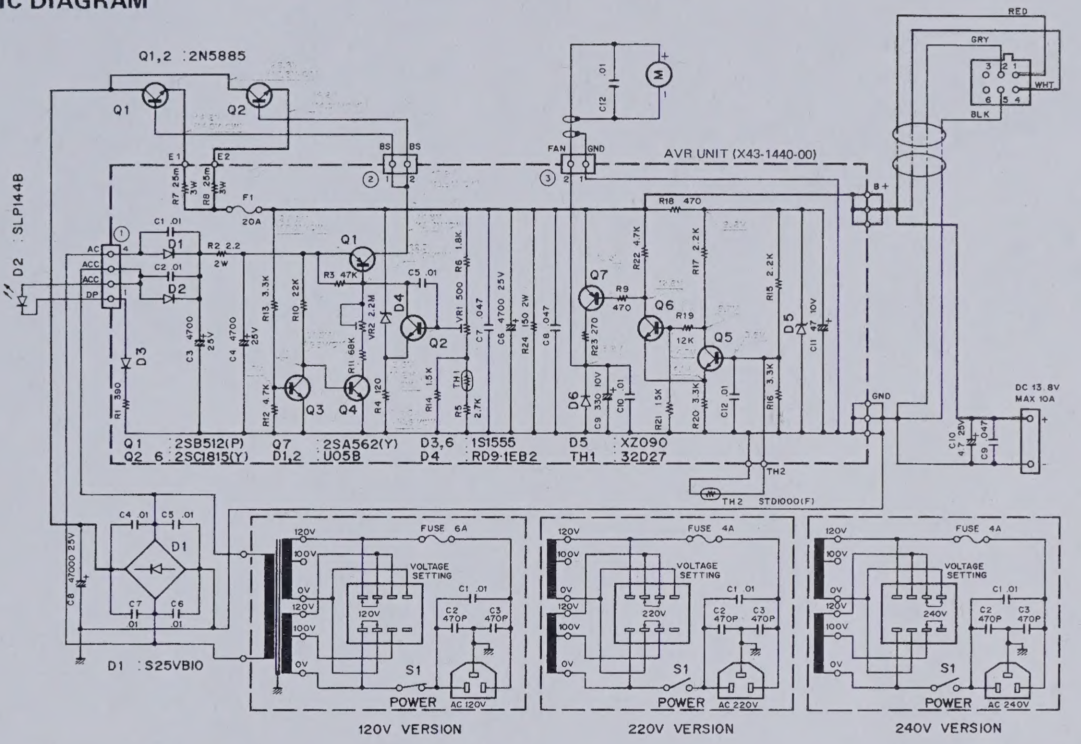
Q2,14,20 : 2SC1923(O)
Q3～5,7～9,15,16,21～24
30,31,45～47,66,68,69,10,1,70
: 2SC1815(Y)
Q11～13,17～19 : 2SC1775(E)
Q25,29,32,34～39,41～44
48～51,55～59
: 2SC1815(Y)
or 2SC945(Q)
Q26,27,6 : 2SC460(B)
Q28 : 2SC1959(Y)
Q33,40,52～54,60～65,67
: 2SA1015(Y)

D1,7 : ITT310
D2,3,10～13,17～21
24～75,77～84
: 1S1555
D4～6,15,16 : 1S1587
D8,14 : 1SV53A
D9 : 1SV54GC
D22 : RD9.1EB2
D23 : 1N60
D76 : RD5.1EB1

TH1 : 25029

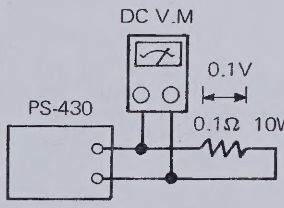
PS-430

SCHEMATIC DIAGRAM



ADJUSTMENT

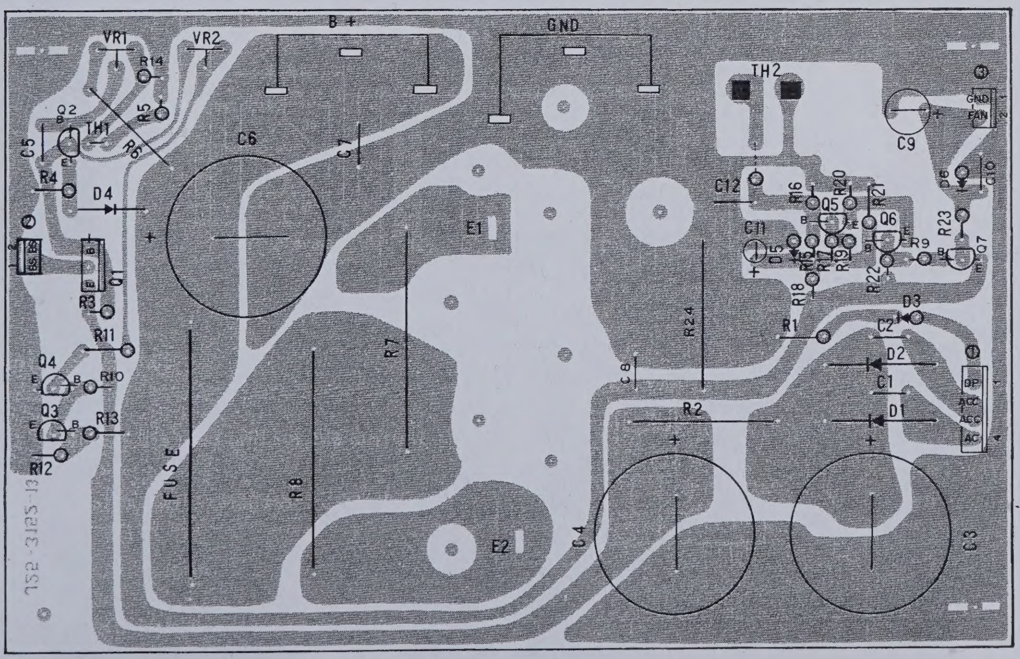
1. Connect the load and set the current to 15A.
2. Adjust output voltage to 13.8V ± 0.4V with VR1.
3. Protection circuit



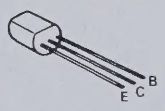
Connect a 0.1Ω 10W resistor and adjust VR2 so that 0.1V DC is obtained.

PC BOARD VIEW

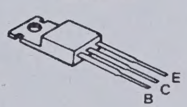
AVR UNIT (X43-1440-00) **Component side view**



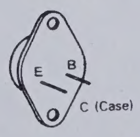
2SC1815



2SB512



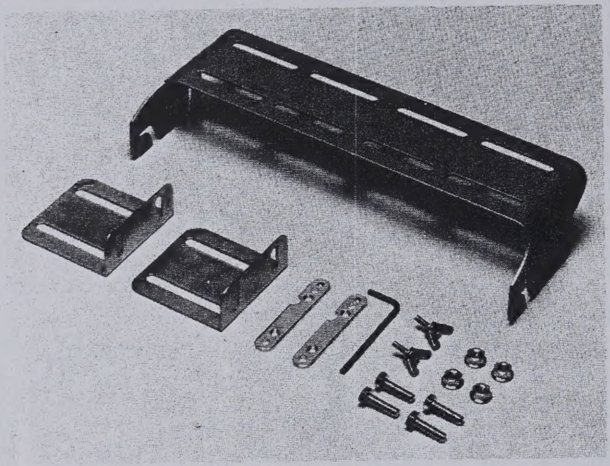
2N5885



SLP-144B

MB-430/SP-430

MB-430 OUTSIDE VIEW



SP-430 SPECIFICATIONS

SPEAKER SIZE	3"
RATED INPUT	1.0 watts
IMPEDANCE	8 ohms
FREQUENCY RESPONSE	300 Hz to 5 kHz
DIMENSIONS	4-7/8" wide x 3-3/4" high x 9-1/3" deep (excluding feet)
WEIGHT	3.1 lbs.

SP-430 PARTS LIST

N : New parts

Part No.	Re-marks	Description	Ref. No.
A01-0942-03	N	Case (B)	
A01-0944-13	N	Case (A)	
A20-2468-03	N	Panel K,M	
A20-2469-03	N	Panel T	
A23-1431-04		Rear panel	
B04-0406-04	N	SP grill	
B07-0613-14		SP ring	
B39-0407-04		Spacer x 2	
B46-0404-00		Warranty card K	
B50-4026-10	N	Instruction manual K,M	
B50-4027-00	N	Instruction manual T	

MB-430 PARTS LIST

N : New parts

Part No.	Re-marks	Description	Ref. No.
A13-0635-03	N	Angle	
B50-4016-00	N	Instruction manual	
H01-4453-13	N	Packing control (inside) **M**	
H01-4454-13	N	Packing control (inside) **T**	
H25-0077-04		Protective bag	
H25-0098-04		Protective bag 150 x 480	
J30-0521-04	N	Spacer x 2	
N09-0007-05		Wing bolt x 5	
N09-0008-04		Hex. screw x 6	
N14-0009-04		Nut x 6	
N15-1060-46		Flat washer x 6	
N16-0060-46		Spring washer x 6	
N32-3006-46		Flat screw x 4	
N99-0309-04	N	Hex. head screw x 6	
W01-0401-04		Hex. wrench	

Part No.	Re-marks	Description	Ref. No.
E20-0208-04		Terminal plate	
E30-1629-15		SP cord	
G53-0507-04		Packing x 4	
H01-4468-14	N	Packing carton K,M	
H01-4469-04	N	Packing carton T	
H10-2513-02		Packing fixture (F)	
H10-2514-12		Packing fixture (R)	
H12-0445-04		Cushion	
H20-1407-03		Protective cover	
H25-0077-03		Protective bag Accessory	
J02-0323-05		Foot x 4	
J02-0409-04		Assistant foot	
J21-1144-14		SP mounting hardware x 2	
J21-2573-04		Foot mounting hardware x 2	
J61-0019-05		Vinyle tie	
N15-1030-46		Washer x 8	
N30-3008-46		Round screw x 4	
N35-3006-41		Bind screw x 12 Case	
N87-3006-46		Self tapping screw x 6	
N87-3008-46		Self tapping screw x 4	
T07-0224-05	N	Speaker	

TRIO-KENWOOD CORPORATION
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